Retrospective study on functional and radiological outcome in patients operated for mid lumbar fractures of spine admitted to the spinal disorders unit of CMC Vellore from 2001- 2010

A dissertation submitted in partial fulfillment of the requirement for the award of M.S. (Branch II, Orthopedic Surgery I) degree examination of the Tamil Nadu Dr. M.G.R. Medical University, Tamil Nadu, to be held in March 2013

DECLARATION

This is to certify that the dissertation entitled, **"A retrospective study on functional and radiological outcome in patients operated for mid lumbar fractures of spine admitted to the spinal disorders unit of CMC Vellore from 2001- 2010"** is the bona fide work done by **Dr. Bhim Bahadur Harijan** In the Department of Orthopedics, Spinal Disorders Unit, Christian Medical College Vellore, in partial fulfillment of the requirement of the Tamil Nadu Dr. M.G. R. Medical University, for the award of M.S. Degree Branch II (Orthopedic Surgery) Degree under the supervision and guidance of **Prof. Dr. K. Venkatesh** during the period of his post graduate study from march 2010 to February 2013.

This consolidated report presented herein is based on bona fide cases studied by the candidate himself.

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CERTIFICATE

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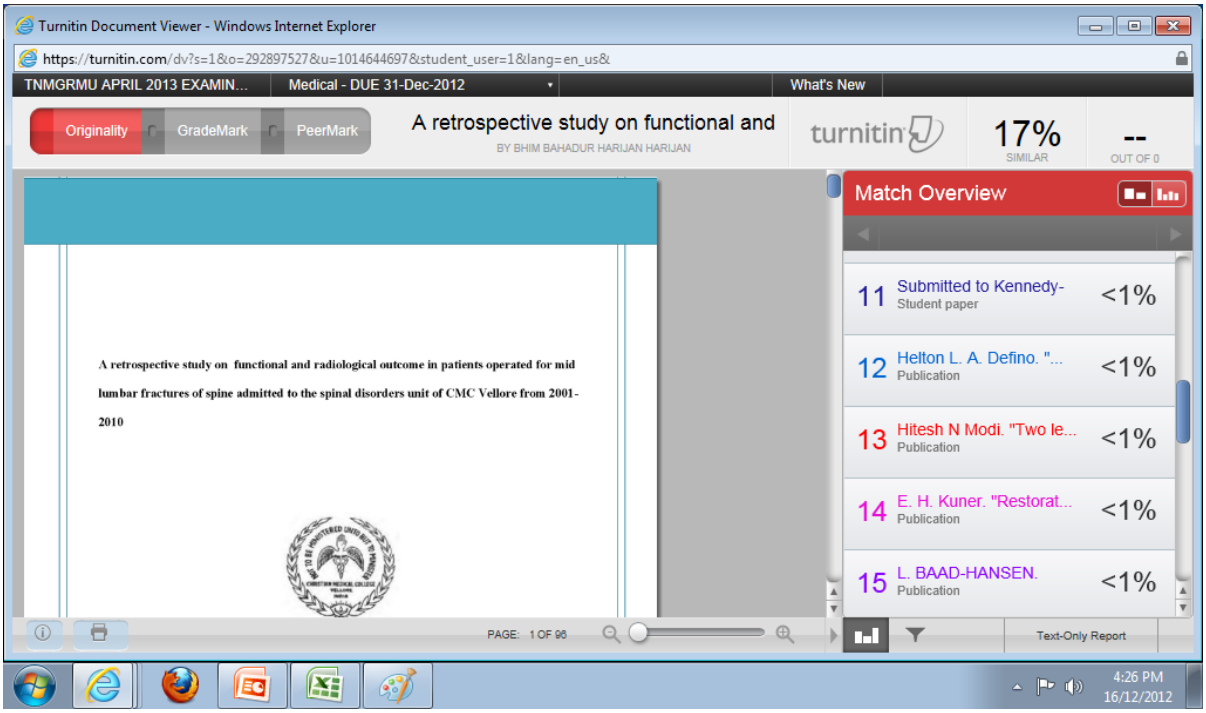
Above all I thank my God Almighty who made all this possible

Dr Bhim Bahadur Harijan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FORMAT

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DEPARTMENT	:	SPINAL DISORDERS UNIT, DEPARTMENT OF ORTHOPEDICS
NAME OF THE CANDIDATE	:	DR. BHIM BAHADUR HARIJAN
DEGREE AND SUBJECT	:	M.S.ORTHOPEDIC SURGERY
NAME OF THE GUIDE	:	DR. K. VENKATESH

OBJECTIVES:

To assess neurological recovery using ASIA impairment scale , To assess functional status using FIM (Functional Independent Measure) in paraplegic patients and Denis Work scale in all patients.,To assess loss of sagittal alignment correction and loss of translational deformity using Cobbs angle and Translation ratio. To determine the role of surgery to reduce, stabilize and maintain the alignment in the mid lumbar region

METHODS:

A review of all the patients from the spinal disorders Unit of the department of Orthopedics , Christian Medical College and Hospital vellore, diagnosed and operated with mid lumbar fractures (l2,l3,l4) over a period of 10 years, was performed. Approval of the institutional review board was obtained. The charts, radiographs at the time of admission, CT scans were reviewed. Patients without adequate or available radiographs were excluded. ASIA scale was used to determine neurological status. Cobbs angle and Vertebral translation ratio was used to measure loss of correction of kyphosis and translation after surgery. Denis work scale and pain scale as well as FIM was used to measure. The data was entered in SPSS version 16 and statistician was involved in statistical analysis. Basic descriptive analysis , Chi Square test and T tests were used for analysis.

RESULTS:

The mean age was 29.6. Range (16 - 57 years). More than 80 percent of the patients were less than 40 years of age (93.8%). The sub group (21- 30) had the highest number of patients. (31.2%) Thirty (93.75%) were male and 2(6.25%) were females. 65% percent were manual labourers or farmers. About 60% of the patients were married. Fall from injury was the most common of mechanism of injury 26 (81.2%) followed by Road traffic accident 4 (12.5%) and fall of heavy object on the back 2 (6.2%). Most of the patients were labourers and farmers injuries were related to work (fall from coconut/palm tree or fall in into the well). More than half the patients 17 (53.1%) had associated injuries. And lower limb injuries were most common 10 (58.82%), followed by upper limb 3 (17.64%). 3 (17.64%) patients also had multi system injuries. 9.4% of patients also had multi system injuries. L2 was most frequently involved 20 (62.5%) followed by L3 9 (28.1%) and L4 3 (9.4%) Burst fracture was the most common fracture type 19 (59.4%) followed by flexion distraction injury 6 (18.8%), fracture dislocation 4 (12.5%) and Compression 3 (9.4%)22 (68.75%) patients had neurological deficit and 10 (34.4%) were neurologically intact. 9(28.13%) patients had complete deficit where as 13(40.62%) had partial deficit . Most patients had neurological recovery and very few had loss of correction of deformity and most of them were functional independently.

CONCLUSIONS:

1. The operative stabilization allows early rehabilitation in patients with fractures of lumbar spine .
2. The choice of injury is dictated by the severity of injury.

The correction achieved in sagittal plane as well as reduction of translation achieved are maintained at the follow up averaging more than three years

INTRODUCTION

INTRODUCTION

Fractures of the low lumbar spine have distinct anatomical, biomechanical and neurological features. These distinguish them from those at the thoracolumbar junction. (1)

Spinal canal is widest at L2 level. Upto 90 per cent compromise in the cross-sectional area of the canal in this area has been associated with the no neurological deficit.(2)

In addition, neurological dysfunction in this area there is likelihood of spontaneous recovery. Therefore it simulates a peripheral-nerve injury which is not the case when cord or the conus medullaris is injured.(2–6). Therefore the treatment of mid lumbar fractures can't be optimized from the literature focusing on thoracolumbar fractures

There is no strong evidence supporting superiority of operation over non operative treatment with regards to long term functional outcome. Optimal treatment of mid lumbar fractures has been debatable and evidence based guidelines almost lacking.(7)

Mid Lumbar fractures represent a separate entity and they are more stable after a vertebral column injury because of sagittal contour, neurologic elements, and the iliolumbar ligaments.(6,8,9)

AIMS & OBJECTIVES

AIMS & OBJECTIVES

AIM

To study the clinical , functional and radiological outcome following operations in patients with mid lumbar fractures from 2001 – 2010 in Department of Spinal Disorders Department , Christian Medical college , Vellore 632004.

OBJECTIVES OF THE STUDY

To assess functional status using FIM (Functional Independent Measure) in paraplegic patients and Denis Work scale in all patients.

To assess pain status after surgery.

To assess loss of sagittal alignment correction and loss of translational deformity correction.

To assess fusion after fracture fixation

To assess early and late complications of surgery

To assess implant failure/death.

To determine the role of surgery to reduce, stabilize and maintain the alignment in the mid lumbar region

To assess neurological recovery using ASIA impairment scale

LITERATURE REVIEW

LITERATURE REVIEW

1.1 Epidemiology

The vertebral injuries comprise of around 6% of all fractures with 15 – 20 % of these having contiguous injuries.(10) Mortality in patients with spinal cord injury during initial admission is around 17%. More male sustain these injuries and are more because of the road traffic accidents in the affluent countries while its due to work related fall in the developing countries.(10) Mid lumbar fractures are not common when compared with thoracolumbar fractures and they represent a portion of all Fractures of the vertebral column.(10,11) There have been no prospective reports in literature stating the prevalence of mid – lumbar fractures of the spine. Panagiotis has used 'mid – lumbar' fractures in his study to denote L2-L4 fractures and has argued that these fractures are distinct from the fractures of the vertebra cephalad and caudad. L1 vertebral fractures tend to behave like the fractures of the thracolumbar junction and L5 fractures are mostly treated conservatively hence the significance of treating the mid lumbar (L2-L4) fractures differently.

1.2 Pathoanatomy

Lumbar spine consists of 5 vertebras with intervening intervertebral discs. It is lordotic in sagittal plane. The lumbar spine is more mobile than thoracic spine in flexion extension and lateral bending. There is restricted rotation in the lumbar spine due to the orientation of the lumbar facets which amounts to about 10 degrees compared to about 75 in the thoracic spine.

Conus medullaris ends at lower end of L1 and in the mid lumbar level only the cauda equine lies which contains motor and sensory roots of the lumbo sacral myelomeres.

The mid lumbar spine has characteristic anatomical, biomechanical and neurological features which separates them from those of the thoracolumbar junction. (1) Decisions about stability and definitive management are also accordingly different compared to more proximal fracture. (11) The way the the vertebral bodies of L4 and L5 are orientated , and the morphology of the disc between T12 and L5 determine the physiological lordosis of the lumbar spine. It Results from the relatively greater anterior height of the intervertebral discs at L3–L4, L4–L5 and L5-S1.(12,13). The lumbar spine is more mobile as opposed to the relatively limited motion of thoracic spine. This is more significant in flexion extension. There is about 20◦ of mobility in the flexion-extension at L5-S1, compared to about 12◦ at the thoracolumbar junction. The neural canal has different content and different size in this region when compared to the other regions and this is important from a neurological point of view. Spinal canal is widest at L2 level and up to 90 per cent decrement in area of the canal in this region have been reported with the no neurological deficit.(2). The Conus typically ends in L2. At and distal to L2 level, cauda equine alone, which consists of multiple resilient nerve roots, occupies the spinal canal. The damaging force is therefore effectively distributed in this region unlike in the spinal cord which is a single uniform mass and hence decreasing the susceptibility to damage.

In addition, in neurological dysfunction in this area, there is likelihood of spontaneous resolution.

therefore it simulates a peripheral-nerve injury unlike in injuries to the spinal cord or the conus medullaris.(2,6,14,15) .These features explain why severe neurological deficits are infrequent in this region and that the neurological resolution is likely it is present. The body's center of gravity in the lumbar spine falls posterior to the axis of the vertebral column or along it. The apex from the lordotic curve of the lumbar spine falls on L3 and the lordosis is decreased by small amount of flexion which places the axially directed load force-of-injury vector directly through body of the vertebra.(14) This reduces the flexion moment arm to the mid lumbar region and hence the chance of kyphosis and collapse is reduced. (14) In The lumbar region pure axial load injuries are more common. (15) The risk of worsening of neurological status is low because the posterior column and with its elements provide stability.(14–16) The presence of iliolumbar ligaments and the fact that it is located distal to pelvic brim help stabilize the fractures of the lower lumbar region when compared with fractures at the thoracolumbar junction(8). This is a unique feature. Therefore the treatment of mid lumbar fractures can't be optimized from the literature focusing on thoracolumbar fractures. Mid Lumbar fractures represent a separate entity and they are more stable after a vertebral column injury because of sagittal contour, neurologic elements, and the iliolumbar ligaments.(8,16,17)

1.3 Mode of injury

According to western literature most common mode of injury is road traffic accidents.(15,18) In the Asian scenario however work related fall from height or fall into well has been found to be commoner modes of injury.(18)

Mechanism of injury

The fundamental problem of classifying the injuries accordingly to the presumptive mechanism is that it is possible to get morphologically different patterns of injury after same mechanism and likewise similar morphologic patterns of injury can be result of different injury mechanisms. Nevertheless it helps us to understand the injury as well and to anticipate the extent and nature of injury.

1.4 Primary Injury of the spinal cord

It refers to the physical tissue disruption caused by mechanical forces

1. Contusion – Sudden, brief compression by the displaced structures. They are potentially reversible.
2. Compression: It results because of decreased size of the spinal canal because of angulation or translation of the spinal column either mechanically or by interruption of spinal vascularity.
3. Stretch: Results in longitudinal traction as in case of flexion distraction injury
4. Laceration: caused by penetrating foreign bodies, missile fragments or displaced bony spiclues.

1.5 Secondary Injury:

It refers to additional neural tissue damage resulting from the biologic response initiated by the physical tissue disruption. Changes in the local blood flow, tissue edema, metabolite concentration and concentration of chemical mediators lead to propagation of inter dependent reactions. It can lead to tissue destruction and functional loss.

1.6 Evaluation

Treatment of patients with spinal injury needs a coordinated effort from multidisciplinary team consisting of emergency personnel, emergency doctors, trauma surgeons, orthopedic surgeons, spine surgeons, anesthetists, nurses, rehabilitation physicians and therapists. Treatment becomes more challenging in case of poly trauma.(19)

1.7 Treatment by First Responder

Treatment of patients who sustain vertebral injuries starts in the place of occurrence of accident and it in fact is the most crucial aspect of the treatment. Focus is on evaluation of the overall condition of the patient and trying to understand the nature of injury.

Then patient needs to be transported to a referral facility with expert help available round the clock. While doing do, it's important to follow the dictum ' everyone has cervical spine injury' until proven otherwise by the experts after thorough evaluation.(20) Therefore all cases of trauma should have cervical collar even before transferring from the scene on incident.

Any efforts at resuscitation should be done with manual inline cervical traction and should be log rolled onto a spine board which requires minimum four people. Fluid should be started at the earliest sign of hypovolemia. In patients with spinal cord injury, hypotension might not be associated with tachycardia as with other hypovolemic shock. When indicated patient might have to b intubated in which case spine should be stabilized and therefore head tilt manouevre should be avoided. Patient after initial treatment should be transferred promptly to a referral facility on a spine board with cervical collar and addition head should be taped to the board with sand bag on both sides in order to prevent rotator movement at the cervical spine.

1.8 Initial Evaluation and resuscitation

Again in the hospital, order of resuscitation is cervical spine stabilization followed by airway, breathing circulation. Index of suspicion should be high since the incidence of associated injuries is high in which case fluids should be started promptly and vasopressors used whenever indicated. In order to maintain prevent and decrease progressive neurological injury, it is important to maintain mean arterial pressure more than 90 mm Hg

1.9 Examination

Life threatening injuries should be addressed first. It is very important to systematically and thoroughly examine the patient and about a third of the acute spinal injuries can be missed.(21) 5% of the patients have non contiguous injuries and half the secondary lesions can initially be missed with mean delay of diagnosis of 53 days.(22) In patients with head

injuries, patient who is intoxicated and patient with multiple injuries, the diagnoses is likely to be delayed. Therefore detailed assessment including careful history, physical examination including neurological examination and radiologic examination should be done. Ideal position for examination is when the entire spine is held in immobilization, at neutral over a surface which is firm. This is done manually , using collars, supports or with the use of straps. Associated injuries should always direct the doctor towards spinal injuries. The presence of associated injuries has been found to be as high as 47%.(22,23) Injuries of the vertebral column tend to cluster at the junctional areas so these areas should be examined with even more index of suspicion. Cranio cervical dissociation is one of the most common and most serious injuries missed.(24) Subtle signs like priapism may suggest a spinal cord injury. Signs of direct trauma should be looked for in inspection like, ecchymosis, contusion, laceration and indirect trauma associated injury to the head, scapula, pelvis, and long bones should be looked for. American Spinal injury Association guideline which focuses on motor, sensory and proprioceptive levels should be used for thorough neurologic examination.(25) It should be kept in mind that neurologic injury can present differently according to the nature of injury i.e. nerve root injury, partial cord injury or complete cord injury. Partial cord injury can take the form of anterior cord syndrome, central cord syndrome, or Brown Sequard syndrome. We should never miss out on rectal examination including examination of S2, S3, S4 nerve roots. The anal wink and bulbocavernous reflex should always be checked. Extreme care should be taken while log rolling the patient since there is chance of injuring the cord in the presence of an instability. Skin should be examined for bruising and abrasions, and spinous process palpated for tenderness and diastasis. Spinal shock is indicated by the absence of these reflexes and associated hypotonia and areflexia. Till the spinal shock

resolves which can take up to 72 hours, the examination of level of injury may not be reliable and therefore the need for caution regarding management options.

1.10 Spinal shock

It's the physiological spinal cord dysfunction in the absence of structural disruption. Resolution usually takes place within 24 hrs of injury when and is characterized by return of reflexes caudal to the injury.

1.11 Neurogenic shock

It's the sate of flaccid paralysis, areflexia, and lack of sensation to physiologic spinal shutdown in response to injury. It's secondary to sympathetic outflow disruption with resultant unopposed vagal tone and is commonly see in cervical and upper thoracic spinal injuries. Bulbocavernous reflex is the first to return. Clinically there is initially hypertension and tachycardia followed by hypotension and bradycardia. Treatment is by monitored IV fluids.

1.12 Bulbocavernous reflex:

When trigone of the bladder is stimulated by either squeezing the glans penis, tapping the mons pubis or pulling the catheter the contraction of the anal sphincter is called bulbocavernous reflex. Its absence indicates spinal shock and its return is the end of spinal

shock. When there is complete lesion after the shock has resolved then there almost nil chance of recovery. It is however not prognostic for lesions involving the conus medullaris or the cauda equine.

1.13 Imaging

Imaging helps us determine if the injuries have rendered the spine unstable since the details of injuries that have occurred can be assessed using different imaging modalities.

Plain radiographs helps us determine the level of injury, associated fractures in the spine like fractures of the spinous process, transverse process, lamina and it also helps to find out other skeletal injuries. The various radiological abnormal findings include a kyphosis, anterior translation, bilateral dislocation/ fracture of facet joints.(26)

Lateral, posteroanterior and open view odontoid view of the full cervical and thoracolumbar fracture are the initial x rays ordered which detects more than 90% of cervical spine injury. Oblique views can be helpful in assessing, facets, foramina, pedicles and vertebral bodies. Relative position of the spine with respect to the spinous processes at each level gives us an idea of rotational alignment. When one level is injured there are chances of other levels also being injured. Commuted Topography scan is indispensible mode of evaluation once the level of injury has been identified. It helps us pre operative assessment a lot. Suspicion of ligamentous injuries, worsening neurological deficit, disc herniation warrants MRI examination

Commuted Tomography gives us additional information like the extent of encroachment of neural canal, injuries of the posterior elements and concomitant soft tissue injuries.(26)

In some cases, palpable gap between the spinous processes on clinical examination is suggestive of PCL injury.(27–29) Radiologically PLC injury is recognised by separation of spinous processes, widening of facet joint and facet perch or subluxation and is can be grouped as being intact, being indeterminate or being disrupted which can be assessed by X rays as well as Commuted Topography scan or MRI imaging. Vertebral body translation or rotation is an indirect measure of PLC disruption. The dislocations of both the facets usually means there is tear of PLL (posterior longitudinal ligaments) and ALL (anterior longitudinal ligaments) and and capsule of the left sided facet joint.

A study found out ultrasound to be excellent in determining the integrity of supraspinous and interspinous ligaments.

Use of Ultrasound in special situations (i.e. in patients with pacemakers, claustrophobia) could be stressed upon to predict the integrity of ligaments not to mention its cost effectiveness.

1.14 Classification

Classification forms the basis for decision making. All major classification systems are based on Holdsworth two column and Denis three column classifications. AO Magerl, ABC classification, Thoracolumbar Classification and severity Score are the currently accepted classification systems.(28)

Holdsworth , Denis, AO Magerl and Load sharing classification describe static view of spinal displacement using anatomical and mechanical principles.

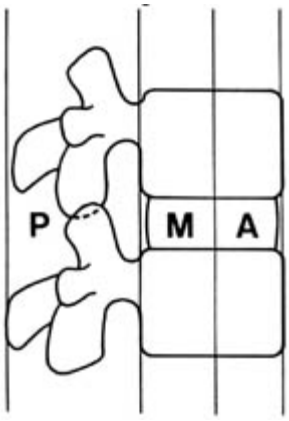
1.14.1 Denis classification. (15)

Anterior column- Constitutes ALL, anterior part of annulus, as well as anterior part of body of the vertebra.

Middle column - Very important to spinal stability; consists of PLL, anterior part of annulus, and the posterior part of the body

Posterior column- Constitutes neural arch, bilateral facet joints with its capsules, the yellow ligament, (ligamentum flavum), and remaining ligamentious complex

1.14.1.1 Compression Fracture

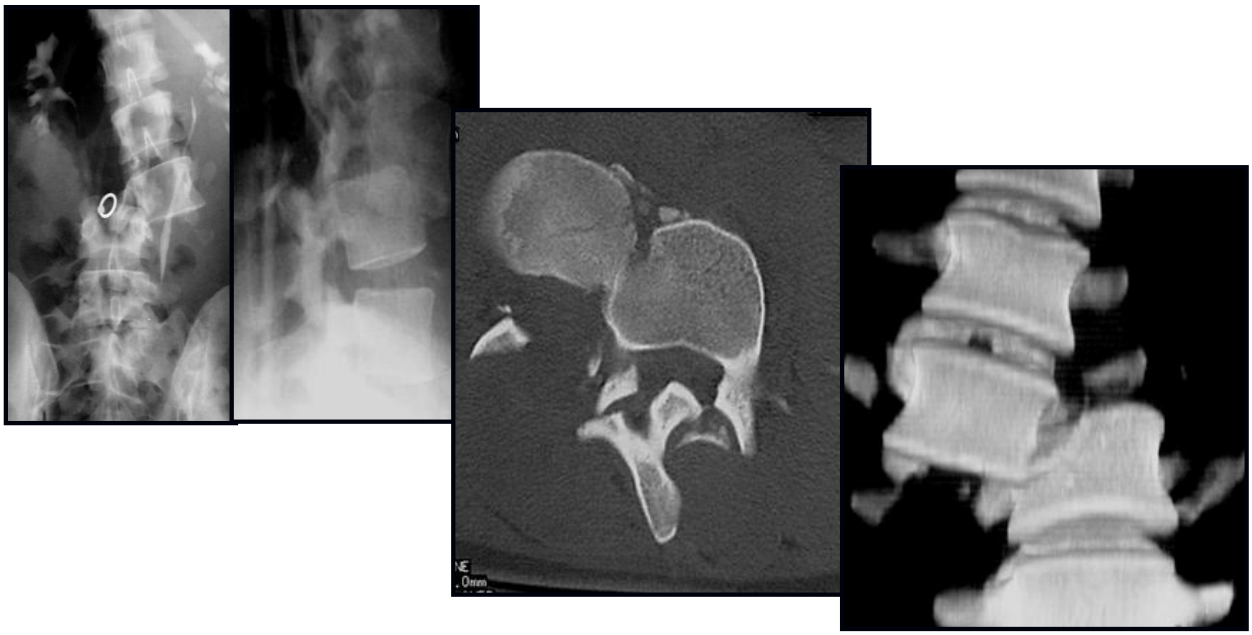


1.14.1.2 Stable Burst Fracture

1.14.1.3 Unstable Burst Fracture

1.14.1.4 Flexion Distraction Injury

1.14.1.5 Translational Shear Injury



1.14.2 AO Magerl Classification (26)

AO magerl classification is based on increasing morphological damage. A (Compression), B (distraction) and C (rotation) injuries

These are again divided into three subtypes and, each subtypes subsequently into three further groups and each sub groups in sub divisions. It's very detailed but complex system of classification.

1.14.3 Thoraco lumbar classification and severity score (28)

Thoracolumbar Classification and severity Score was devised by Vaccaro et.al and considers three features of injury

Radiologic morphological pattern of the injury

The status of posterior elements

Patients Neurology on clinical examination

A injury severity score was calculated based on these characteristics and patients stratified into operative or non operative treatment groups. It also provides surgical guidelines for management of complex injuries (28)

Validity of this new classification system needs to be still evaluated.

1.15 Initial treatment

Dissipation of energy at the time of trauma is what mediates the primary neurologic injury. The injury can be cord stress, compression, tension, shear, disruption. When there is change in biochemical environment of the cord associated with ischemia Secondary injury ensues. It can also occur in presence of an unstable spine which has not been stabilized. It is recommended to administer steroids in the presence of neurologic deficit.(15) Methylprednisolone is given at a dose of 30 mg/kg loading dose followed by maintenance dose of 5.4mg/kg/hr for 24 hours if administered within 3 hrs of injury. If the loading dose is delayed, maintenance dose is prolonged for 48 hrs. Gastro intestinal ulcer prophylaxis is achieved using proton pump inhibitors. Patient's position should be changed periodically or should be transferred to rotating bed to prevent decubitus ulcers. This is more important in patients with sensory deficit. Timing of surgery is dictated by the overall condition of the patient and availability of multidisciplinary team. It is however desirable to achieve early surgical stabilization and early cord decompression with hope of improving neurological outcome.

1.16 Spine trauma evaluation

Spine injuries can be either stable or unstable injuries. They can also be either soft tissue injuries or fracture. When spine is unable to maintain normal structural relationship under physiological load, then such an injury is characterized as mechanically unstable injury. Mechanism of injury is another way of classifying injuries which represents the forces

applied to the spine. The forces could be distraction and compression, flexion and extension or combination of these.

Denis suggested that two of the three columns if have failed then the injury becomes unstable.(15) It requires the middle column to fail and in addition either anterior column or posterior column. Middle column is assessment is done radiologically by assessing vertebral body's posterior part and the PLL. Where there is widening if the pedicles, more than 25% loss of the vertebral height of the posterior wall and obvious fracture of the vertebral cortex failure of the posterior wall is suspected. When there is vertebral body translation of more than 3.5mm and angulation greater than 11deg then it means that the posterior longitudinal ligament is disrupted

Lumbar spine has a lordotic curve where as the thoracic spine has a kyphotic curve.

It's common to have fractures below the thoracic spine since the thoracic spine is protected by the rib cage. The three column concept is integral part of evaluation of the lumbar spine. It helps to predict the injury pattern and stability when used with mechanism of injury. (30) Compression fractures are stable fractures with disruption of only one column and can be treated mostly non operatively with close follow up. Burst fractures involve the disruption of two columns and are frequently unstable injuries. Flexion distraction injuries result when middle as well as posterior column fail in tension while the anterior column acts as a hinge. They should be not be mistaken for compression fracture which results in disastrous complication due to inadequate spinal protection. Fracture dislocation is characterized by

failure of all three columns and is associated with high incidence of neurological deficit.(15) They almost always require definitive stabilization.

Optimal treatment of mid lumbar fractures has been debatable and evidence based guidelines almost lacking.(7) Retrospective case series form a large chunk of scientific evidence. Conservation treatment varies from extended periods of bed rest to early mobilization using protection. The Advantages being reduced cost and avoidance of risk of surgery and satisfactory outcome.(31)

1.17 Treatment

In patients without a neurological injury, the results of long term follow up when treated non-operatively have been similar to the one with operative treatment.(6,13,32–34)

The surgical Options are through an anterior, posterior or and combined approach.(33)

Operation is found to achieve improvement in spine alignment, and is found to allow early mobilization and faster rehabilitation thereby reducing complications of prolonged immobilization.(32) This however has so far not been found being related to the ultimate clinical as well as neurological outcome.

1.18 Operative vs. Non Operative treatment

The goals of the treatment in general are:

1. Protection of and restoration of neurological elements and function.

2. Correction and prevention of collapse as well as deformity in the injured segment.

3. Prevent spinal instability as well as pain.

4. To allow early mobilization without pain.

5. Restoration of normal spine mechanics.

1.18.1 Non Operative treatment

Some patients with stable fracture pattern can be treated non operatively. The various treatment options are use of brace, or orthosis, hyperextension cast and mobilization as early as possible.

1.18.2 Operative treatment

In the recent past, operative treatment of the unstable spinal injuries has been the standard of care. We are continuing to get better surgical outcome, decrease mortality, morbidity, and improved long term function with rapid return to work due to improvement In surgical technique and implants.(35–37)

In case of unstable lumbar fractures, where there is disruption of stability of the spine, there is pain, and there deformity with or without neural injury, reconstruction and early mobilization after segmental instrumentation is the procedure of choice. Long and short construct strategies have been developed for spinal fixation with each having distinct advantages serving different situations best.

Advantages of operation are – Immediate stability of the spine for those unable to tolerate a cast requiring extended period of bed rest. Life threatening complications of prolonged recumbence is prevented. It helps in early rehabilitation with lesser number of complications.(33,38,39)

It also rapidly restores alignment and translation deformity and canal dimensions than non operative treatment. It also is associated with more reliable restoration of neurology as well as significant decrease in time spent in rehabilitation.(33,40,41)

1.18.2.1 Indication for surgical stabilization

Fracture dislocations:

These injuries result from high velocity trauma and are often associated with multiple injuries as well as neurologic deficits.(37,42) Mortality as well as morbidity are reduced as a result of accelerated rehabilitation but those with complete spinal cord lesions don't improve as a result of surgery.

1.18.3 Treatment of patients without deficit.

Stability and sagittal plane alignment decide treatment options in these patients. Segmental fixation helps maintain sagittal alignment allowing for distraction of specific segments. When anterior column is deficient, however, the posterior instrumentation alone has difficulty resisting sagittal deforming forces.(43)

In lumbar fractures with severe communities and collapse, anterior instability should be corrected to prevent loss of correction over time. Progressive sagittal collapse is associated with pain and these patients may develop neurological deficit where as fixed kyphosis is usually not symptomatic. Increase of progressive axial and sagittal collapse can be associated with damage to neurologic elements so they benefit from stabilization from mechanical as well as neurological stand point.

1.18.4 Patients with Neurological Deficit: treatment

Operative treatment in these patients protects neurologic function, improves neurology and helps mobilize early thereby not requiring cast/brace. In incomplete injuries, neurological decompressive surgery is associated with significant improvement in final outcome.(43–45) when there are neural elements are significantly compressed when the operation is performed. When the neurologic injury is complete and when there is no residual compression of the neural structures posterior instrumentation alone is adequate. Anterior column reconstruction helps in treatment of sagittal plane deformity as well as instability though it might not improve the chance of neurologic recovery.

1.19 Biomechanics of Spinal Reconstruction

Restoring sagittal alignment

The residual deformity in most cases is kyphotic deformity. In fractures this deformity can be correct by indirect reduction. Desired spinal alignment should be achieved during fixation. Persistent malalignment results in kyphosis which is fixed, flat back and can be the reason for

pain, inability to function well and occasionally failure of implant warranting revision operation. The surgeon can correct the deformity by positioning the patient prone with the support under the iliac crest and the anterior chest wall allowing abdomen and mid trunk to hand free. This allows for normal lordosis as well as corrects kyphosis. Rods can be contoured in situ to store lordosis. Gentle distraction helps reduce facet dislocation or sagittal collapse. There are specially designed implants which aid reduction which by means of pin manipulation corrects sagittal collapse and keeps the construct length neutralized.(44–46)

1.20 Options for Instrumentation:

1.21 The long vs. short fixation constructs.

The choice of construct is dictated by level of fracture, pattern of fracture communition, degree of instability, status of neurological structures as well the decision to do anterior reconstruction or not. Non segmental rod/hook systems(Harrington), Hybrid systems(Luque, Harrington with sub laminar wires), Extended pedicle screw constructs are the long segment constructs available while segmental systems, short segment pedicle instrumentation(SSPI), compression instrumentation , anterior screw/plate or screw/rod instrumentation are the available short constructs

1.21.1 Log Fixation constructs:

Primary Biomechanical principles followed are

1. Multiple Fixation points distribute corrective forces over a greater number of segments and therefore chance of pull out is less.
2. Correction of deformity actively of passively gives a satisfactory sagittal and coronal plane alignment even before instrumentation
3. Anterior column integrity is reestablished before doing instrumentation.
4. In case of thoracolumbar spine when bending forces are applied through the three points, the proximal and the distal fixation points ant through the contact of the longitudinal rod with the mid thoracic laminae axial and saggital bending is resisted and kyphosis created.

Long (Extended) Fixation constructs

These constructs often incorporate an intermediate hook or screw just above the fracture and just below the upper fixation point and are distracted cranially to generate ligamentotaxis or compressed caudally to capture and load an anterior strut or cage. With the two fixation points overall length is neutralized and the intermediate hook or screw allows for segmental distraction of the fracture to improve vertebral height and indirectly decompressed the spinal canal at the same time ensuring that the spine is not over distracted. Proximal and distal hook pairs(claws) are not dependent on strong distraction forces for fixation and they provide more stable fixation as compared to the Harrington Hooks.(47,48)

Segmental systems allow placement of intermediate hooks or screws and thereby distributing corrective forces over more laminae and in effect reducing the likelihood of failure of

fixation. They are better than Harrington rods in axial as well as tensional loading and they allow patients to mobilize early often without a brace.

Pedicle screws if used in place of hooks, pull out strength is maximized and also the strength of fixation is increased as well as torsional strength.

Most of the screw breakage after the union of fracture has occurred are asymptomatic and breakage if occurs before union due to progressive material failure and segmental collapse can occur also in patients protected with brace. Some of the revision surgery have been done for progressive kyphosis and instrumentation failure though fixed residual kyphosis doesn't cause pain most often.(48,49) this problem of segmental collapse can be prevented by using offset hooks or reconstructing the anterior column.(50)

1.21.2 Short Instrumentation constructs

Short segment pedicle screw instrumentation (SSPI) is the most widely used approach for lumbar fracture today though short rood hook system can be effective for flexion distraction injuries and selected injuries.(51)

Short segment pedicle screw instrumentation (SSPI)

SSPI provides sagittal, axial and torsional stability by fixing the spine rigidly and is superior to rod/hook constructs or sub laminar wiring.(47,48) It limits the number of instrumented segments to very minimum. It purchases all three columns through a single dorsal approach. There are no differences between extended pedicle screw construct (2

segments above and two segments below) and short segment constructs in stiffness. Fusion in this case doesn't depend on the integrity of laminae so that's another distinct advantage. There is no need to extend the fixation in case of lamina fracture or laminectomy being done. In the presence of the axial instability, though, SSPI has limited ability to maintain sagittal correction. Once initial bending failure occurs, further collapse is likely causing loss of lordosis and higher incidence of pain. If anterior strut graft or cage is used for anterior column reconstruction or when the anterior column is intact then the sagittal alignment is better maintained and implant failure greatly reduced. (52)

1.21.3 Anterior Reconstruction

A supplemental anterior column procedure is decided by the neurologic injury and vertebral communition. When there is an incomplete neurologic deficit associated with residual compression then anterior reconstruction is usually performed. Surgical decompression is the most important aspect of operative treatment since functional outcome is directly related to residual neurologic deficit most of the time.

It can be done through an abdominal approach. The discs spaces above and below the fractures site is excised and the fractured vertebrae removed piecemeal. The dura is now visible from end plate to end plate and from pedicle to pedicle. This decompresses the canal and now it can be restored using iliac crest or strut graft or a fabricated cage.(53–57)

1.22 Rehabilitation and functional outcome:

Post operatively all the patients require rehabilitation. Analgesics are prescribed for pain and paresthesia. Ambulation is started with the aid of appropriate orthoses like Ankle Foot Orthosis. Weak muscle recovery is aided by strengthening exercise and electrical stimulation. Patient undergo education program about sensory deficit and the complication that can arise from the insensate extremity like pressure sores, orthosis related sores. Intermittent clean catheterization , as opposed to indwelling catheters, are used to prevent urinary tract infection. Stool softeners are used for bowel evacuation wherever appropriate otherwise digital evacuation is done.

It's important to define terms which are used to discuss morbidity after spinal injury.

Impairment: When there is anatomical, psychological or physiological or functional loss at the level of the organ, then it amounts to impairment.

Disability is lack of ability or restriction to perform an otherwise considered normal activity. It relates to ones behavior and performance of activities for self.

Handicap: when the disadvantage caused by the impairment or disability limits or prevents the individual from fulfilling a role that is considered and normal for him/her in the society, such a social disadvantage is called handicap.

1.22.1 FIM

The FIM is a tool which measure severity of disability regardless of the underlying impairment. Its uniqueness is in its inclusion of communication and social cognition.(58). It has good validity, reliability, consistency and precision in measuring disability.(59–61)The use of FIM alone was a predictor of return to work has been suggested by some.(62)

MATERIALS & METHODS

MATERIALS AND METHODS

A review of all the patients from the spinal disorders Unit of the department of Orthopedics , Christian Medical College and Hospital Vellore, diagnosed and operated with mid lumbar fractures (l2,l3,l4) over a period of 10 years, was performed. Approval of the institutional review board was obtained. The charts, radiographs at the time of admission, CT scans were reviewed. The x rays were obtained in supine position during the admission since the patients were unable to stand due to the acute injury. Patients without adequate or available radiographs were excluded. Of the total patients with spinal injury in this period, 48 had mid lumbar fractures. 5 were treated non operatively and were excluded from the study. 32 out of 43 patients were available for follow up. At Follow up, patients were evaluated by history, examination, radiographs, CT wherever indicated and questionnaires administered for evaluation of functional status. The x rays at follow up were done in standing position. All patients underwent thorough clinical examination including peri anal and per rectal examination. All investigations including imaging were stored using GE, Version 3 Centricity of Pictorial Archived Computerized System (PACS).

All patients in the study underwent surgery. Details of the surgery including type of surgery, operative findings and intra operative complications were noted from the record.

All the pre operative details were gathered from outpatient and inpatient files which are recorded in the Medical Records Department. There were retrieved using computer tracking

system. The proforma (refer proforma) was filled with appropriate details which was designed for this study.

All the patients were contacted by post and / telephone, most patients needing multiple reminders. 32 patients out of 43 returned for adequate follow up. All the patients were again examined in detail and imaging as indicated done.

Classification

Denis classification was used to classify the injuries.(15)

1) Compression fracture

2) Burst fracture

3) Flexion distraction injury

4) Fracture dislocation

NEUROLOGY

The American Spine Injury Association impairment scale was used to assess the neurological status.

A- Complete

No motor or sensory function in the lowest sacral segment (S4-S5)

B- Incomplete

Sensory function below neurologic level and in S4-S5, no motor function below neurologic level

C- Incomplete

Motor function is preserved below neurologic level and more than half of the key muscle groups below neurologic level have a muscle grade less than 3.

D- Incomplete

Motor function is preserved below neurologic level and at least half of the key muscle groups below neurologic level have a muscle grade 3.

E- Normal

Sensory and motor function is normal

Functional Assessment : FIM (Functional Independent measure) was used to measure functional status of paraplegic patients. Denis work scale was used for everyone. For pain, Denis pain score was used.

FIM (Functional Independent measure)

We quantified the functional assessment using FIM scores which scores patients ability to perform tasks in 18 activities of daily living. Each item is graded from scale of (total dependence) 1 to 7(total independence). Both motor and cognitive functions are scored. Minimum FIM of 18 means total dependence and 126 imply no disability. The FIM scores were made by direct examination. The functional activity was described and explained to the patient who was followed by various options regarding level of independence in performing each of these activities. Patient was asked to single out the option describing his/her status. It was taken before discharge, after rehabilitation and at follow up. All patients were put through rehabilitation under Physical medicine and rehabilitation department.

Scale:

7 Complete Independence (timely, safely) *(Patient Stamp)*

6 Modified Independence (extra time, devices)

5 Supervision (cuing, coaxing, prompting)

4 Minimal Assist (performs 75% or more of task)

3 Moderate Assist (performs 50%-74% of task)

2 Maximal Assist (performs 25% to 49% of task)

1 Total Assist (performs less than 25% of task)

SELF CARE ITEMS

1. Feeding

2. Grooming

3. Bathing

4. Dressing Upper Body

5. Dressing Lower Body

6. Toileting

7. Swallowing*

SPHINCTER CONTROL

8. Bladder Management

9. Bowel Management

MOBILITY ITEMS (Type of Transfer)

10. Bed, Chair, Wheelchair _____

11. Toilet _____

12. Tub or Shower _____

13. Car Transfer* _____

LOCOMOTION

14. Walking/Wheelchair (circle)

15. Stairs

16. Community Access*

COMMUNICATION ITEMS

17. Comprehension-Audio/Visual (circle)

18. Expression-Verbal, Non-Verbal (circle)

19. Reading*

20. Writing*

21. Speech Intelligibility*

PSYCHOSOCIAL ADJUSTMENT

22. Social Interaction

23. Emotional Status*

24. Adjustment to Limitations*

25. Employability*

COGNITIVE FUNCTION

26. Problem Solving

27. Memory

28. Orientation*

29. Attention*

30. Safety Judgment*

*FAM items

The Dennis Pain and Work Scale

Pain (P) Scale

1. No pain.

2. Occ. minimal pain, no medication

3. Moderate pain; occasional use of medication, not

Precluding the performance of professional or daily

Activities Moderate

4. Moderate to severe pain; occasional job absence,

Significant changes on daily activities

5. Pain constant, incapacitating – Chronic medication use

Work scale

1. Return to previous work (heavy duty) or physical Activities.
2. Able to return to previous activity (sedentary) or return to heavy work with restraints.
3. Unable to return to previous work, but works in another function.
4. 4 .Unable to return to work full-time - Part time work.

5.Unable to work.

Radiological Parameters

Patients AP (Antero- posterior) and cross table lateral radiographs were independently assessed as were transaxial and sagittal CT images with a prepared check list. The saggital kyphosis and translation were noted to quantify the deformity. Cobb Angle was used for the same. Operation notes were reviewed. On follow up they were assessed for any complaints like back aches, decubitus ulcers, Urinary Tract Infections. Any improvement or deterioration of neurological status was recorded. Standard AP lateral were taken at every follow up. Flexion extension x- rays, CT were done when indicated.

Segmental Kyphosis

It was determined from the lines along the superior end plate of the vertebra cephalad to the fractured vertebra and inferior end plate of the vertebrae caudad. All the angles were obtained in digitalized x ray.

Antero Posterior Vertebral translation:

In the lateral X - ray, a vertical line along the posterior border of the upper and the lower vertebra is drawn and the distance between the vertical lines was measured using the GE digital radiography software.

Union (fusion) achieved: Fusion was assessed primarily using plain X ray. Flexion extension views were used to help in determining movement at the operated site. Fusion was diagnosed using the following criteria.

Classification of interbody fusion success: Brantigan, Steffee, Fraser (BSF

BSF-1: Radiographical pseudarthrosis is indicated by collapse of the construct, loss of disc height, vertebral slip, broken screws, displacement of the carbon cage, or significant resorption of the bone graft, or lucency visible around the periphery of the graft or cage.

BSF-2: Radiographical locked pseudarthrosis is indicated by lucency visible in the middle of the cages with solid bone growing into the cage from each vertebral endplate.

BSF-3: Radigraphical fusion: bone bridges at least half of the fusion area with at least the density originally achieved at surgery. Radiographical fusion through one cage (half of the fusion area) is considered to biomechanically solid fusion even if there is lucency on the opposite side.

2) Lance classification of posterolateral fusion success

Grade A: Definitely solid with bilateral trabeculated stout fusion masses present

Grade B: Possibly solid with a unilateral large fusion mass and a contra lateral small fusion mass

Grade C: Probably not solid with a small fusion mass bilaterally

Grade D: Definitely not solid with bone graft resorption or obvious pseudarthrosis bilaterally

Surgical Treatment

All patients had operative fracture reduction and stabilization using either plate (STEFFE) or rod. It was either one level (one vertebra above and one vertebra below) fixation or two level (two vertebra above and two vertebrae below) fixations.

Indications For surgery

1. Mechanical Instability
2. Incomplete neurological deficits.
3. Polytrauma
4. Multiple level injuries

Three types of surgeries were performed

1. Posterior instrumentation and sagittal alignment correct and translation correction only
2. Dual column surgeries

   Posterior instrumentation and anterior column reconstruction (combined)

   Extended posterior surgery

In posterior only surgery, anterior column was not reconstructed

In extended posterior surgery anterior column was reconstructed through posterior approach.

In combined surgery the anterior column was reconstructed through anterior approach.

Parameters studied at the time of follow up

Cinical parameters

Radiological parameters

Clinical

1. ASIA impairment scale

2. Functional Independence measure

3. Denis work and pain scale

4. Complaints

Radiological parameters

1. Level of injury

2. Classification (Denis)

3. Segmental kyphosis

4. Translation

5. Early and late complication

6. Implant death

7.Fusion

Surgical parameters

1. Type of surgery

2. Implants used

3. Level of fixation

4. Surgical approach used

5. Anterior column reconstructed or not.

RESULTS

RESULTS

Demography:

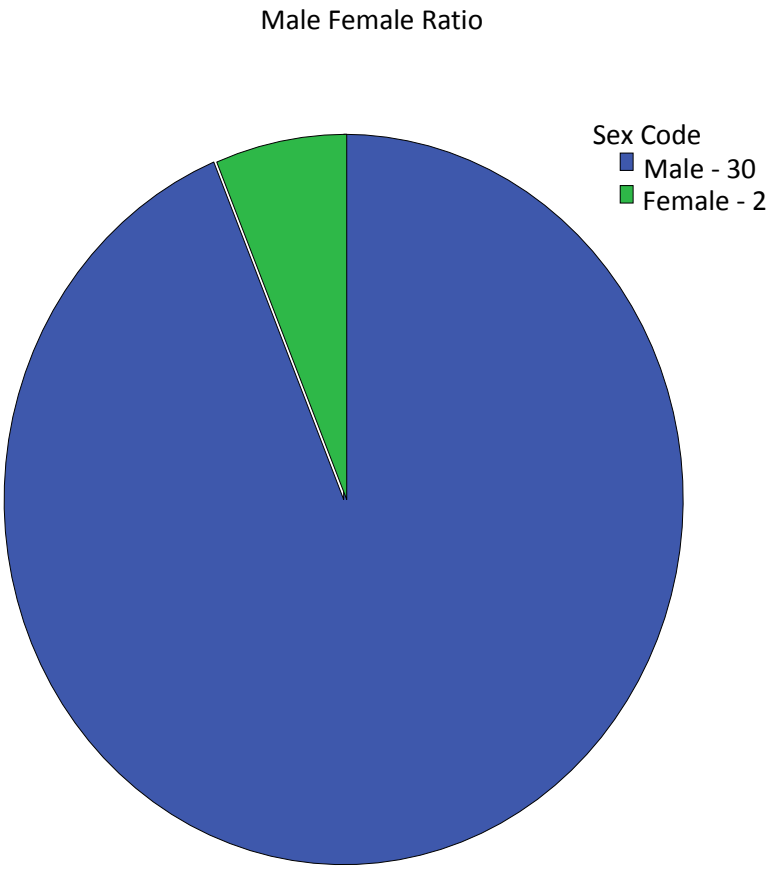
Age distribution

Of the 43 patients operated 32 (74.41%) had adequate follow up.

The mean age was 29.6. Range (16 - 57 years). More than 80 percent of the patients were less than 40 years of age (93.8%).

Male Female Ratio

Thirty (93.75%) were male and 2(6.25%) were females. About 60% of the patients were married.

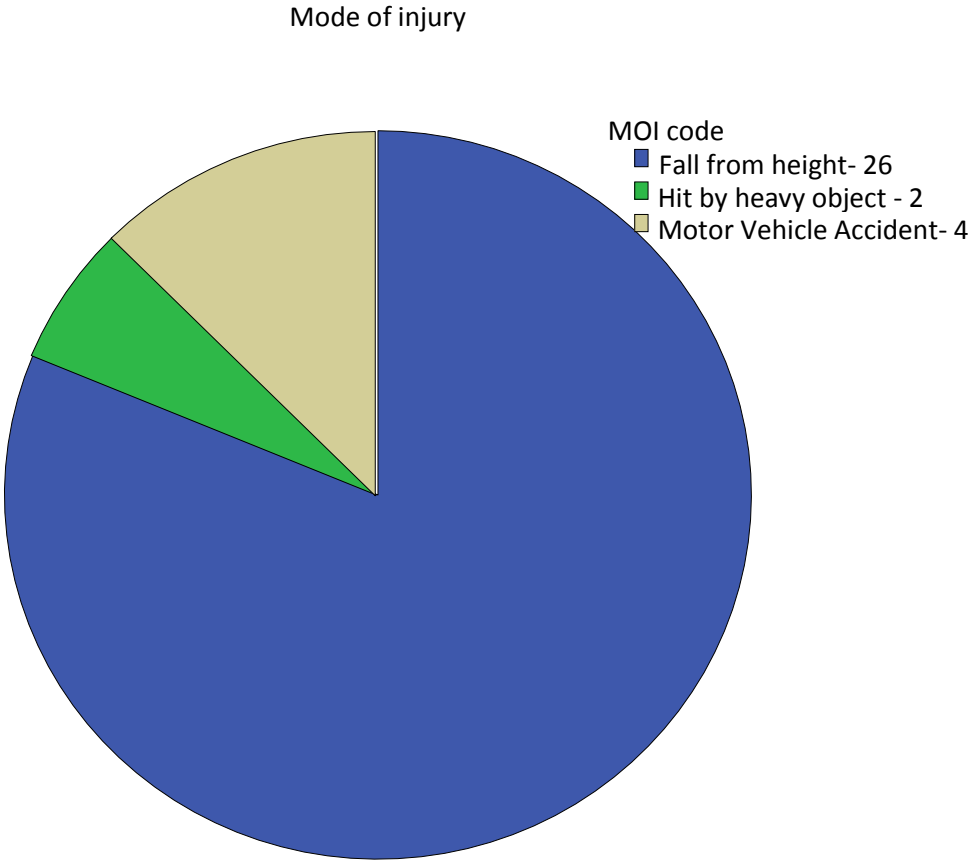


Occupation:

50% of the patients were partially skilled manual labourers. 15% were unskilled, 6% professional and 25% were unemployed.

Mechanism of injury

Fall from injury was the most common of mechanism of injury 26 (81.2%) followed by Road traffic accident 4 (12.5%) and fall of heavy object on the back 2 (6.2%). Most of the patients were labourers and farmers injuries were related to work (fall from coconut/palm tree or fall in into the well).



More than half the patients 17 (53.1%) had associated injuries. Out of the patients with associated injuries, lower limb injuries were most common 10 (58.82%), followed by upper limb 3 (17.64%). 3 (17.64%) patients also had multi system injuries. 4(12.5%) patients had associated other vertebral injuries in other than mid lumbar region.

Fractures

All patients had AP and lateral radiographs (Pre Op/ Post Op and Follow up). The distribution of fractures are as given in the table below.

Level of Injury

	Frequency	Percent	Valid Percent	Cumulative Percent
L2	20	62.5	62.5	62.5
L3	9	28.1	28.1	90.6
L4	3	9.4	9.4	100.0
Total	32	100.0	100.0	

L2 was most frequently involved 20 (62.5%) followed by L3 9 (28.1%) and L4 3 (9.4%)

Classification:

Denis classification was used.

1) Compression fracture:

2) Burst fracture:

3) Flexion distraction injury:

4) Fracture dislocation:

Denis Code

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Compression	0	0	0	0
	Burst	22	68.8	68.8	68.8
	Flexion Distraction	6	18.8	18.8	87.5
	Fract. Dis	4	12.5	12.5	100.0
	Total	32	100.0	100.0	

Burst fracture was the most common fracture type 22 (68.75%) followed by flexion distraction injury 6 (18.8%), fracture dislocation 4 (12.5%) and Compression 0 (0%).

VL Code * Denis Code Cross tabulation

			Denis Code				
			Compression	**Burst**	**Flexion Distraction**	**Fract. Dis**	**Total**
VL Code	L2	Count	0	11	5	4	20
		% within VL Code	0.0%	55.0%	25.0%	20.0%	100.0%
	L3	Count	0	8	1	0	9
		% within VL Code	.0%	88.9%	11.1%	.0%	100.0%
	L4	Count	0	3	0	0	3
		% within VL Code	0.0%	100%	.0%	.0%	100.0%
Total		Count	0	22	6	4	32
		% within VL Code	0.0%	68.75%	18.8%	12.5%	100.0%

ASIA GRADING

Asia CODE

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A	9	28.1	28.1	28.1
	B	1	3.1	3.1	31.2
	C	6	18.75	18.75	49.95
	D	5	15.6	15.6	65.5
	E	11	34.3	34.3	100.0
	Total	32	100.0	100.0	

21 (65.6%) patients had neurological deficit and 11 (34.4%) were neurologically intact. The majority of the patients had partial neurological injury. 9(28.13%) patients had complete deficit where as 12(37.5%) had partial deficit.

Recovery Code

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Nil	**2**	**6.2**	**6.2**	**6.2**
	partial Recovery	**10**	**31.2**	**31.2**	**37.5**
	Full Recovery	**9**	**28.1**	**28.1**	**65.6**
	Intact	**11**	**34.4**	**34.4**	**100.0**
	Total	**32**	**100.0**	**100.0**	

19 (59.3%) had neurological improvement, 10(31.2%) partial and 9 (28.1%) full recovery. Patients who were intact neurologically didn't have worsening of neurological status. (1 patient had transient worsening of neurology) which resolved with watchful observation and steroids. 19 (59.3%) had at neurological improvement at least by a grade. Only 2 (6.2%) patients didn't have neurological recovery at all.

All the patients with partial neurological injury had some improvement in their neurological status, majority of them achieving full recovery.

Asia Pre OP CODE * ASIA final Code Cross tabulation

		ASIA final Code					Total
		1	2	3	4	5	
Asia Pre OP CODE	1	2	2	2	2	1	9
	2	0	0	0	0	1	1
	3	0	0	0	4	3	7
	4	0	0	0	0	5	5
	5	0	0	0	0	10	10
Total		2	2	2	6	20	32

2 out of the nine patients with complete deficit didn't recover at all and only one went onto complete recovery but most of them (6 out of 9) had partial recovery.

Crosstab

			Recovery Code				
			Nil	partial Recovery	Full Recovery	Intact	Total
Asia Pre OP CODE	A	Count	2	6	1	0	9
		% within Asia Pre OP CODE	22.2%	66.7%	11.1%	.0%	100.0%
	B	Count	0	0	1	0	1
		% within Asia Pre OP CODE	.0%	.0%	100.0%	.0%	100.0%
	C	Count	0	4	2	1	7
		% within Asia Pre OP CODE	.0%	57.1%	28.6%	14.3%	100.0%
	D	Count	0	0	5	0	5
		% within Asia Pre OP CODE	.0%	.0%	100.0%	.0%	100.0%
	E	Count	0	0	0	10	10
		% within Asia Pre OP CODE	.0%	.0%	.0%	100.0%	100.0%
Total		Count	2	10	9	11	32

2 out of the nine patients with complete deficit didn't recover at all and only one went onto complete recovery but most of them (6 out of 9) had partial recovery.

Crosstab

			Recovery Code				
			Nil	partial Recovery	Full Recovery	Intact	Total
Asia Pre OP CODE	A	Count	2	6	1	0	9
		% within Asia Pre OP CODE	22.2%	66.7%	11.1%	.0%	100.0%
	B	Count	0	0	1	0	1
		% within Asia Pre OP CODE	.0%	.0%	100.0%	.0%	100.0%
	C	Count	0	4	2	1	7
		% within Asia Pre OP CODE	.0%	57.1%	28.6%	14.3%	100.0%
	D	Count	0	0	5	0	5
		% within Asia Pre OP CODE	.0%	.0%	100.0%	.0%	100.0%
	E	Count	0	0	0	10	10
		% within Asia Pre OP CODE	.0%	.0%	.0%	100.0%	100.0%
Total		Count	2	10	9	11	32
		% within Asia Pre OP CODE	6.2%	31.2%	28.1%	34.4%	100.0%

Radiological Parameters

Sagittal plane alignment:

Cobbs angle: It was determined from the lines along the superior end plate of the vertebra cephalad to the fractured vertebra and inferior end plate of the vertebrae caudad

Pre Op Mean Kyphotic angle was 14.71 and the same post Op was 6.94 and in the follow up was 8.03 showing statistically significant difference between the pre op and post Op angle levels in the follow up group.

loss of Kyphosis

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-5	27	84.4	84.4	84.4
	6-10	5	15.6	15.6	100.0
	Total	32	100.0	100.0	

There was no significant loss of kyphosis at follow up and it didn't have significant association with the type of surgery performed nor the vertebral levels fractured or whether or not the anterior column was reconstructed..

Follow Up Kyphotic angle Code * Type of surgery code Cross tabulation

			Type of surgery code				
			ANT & PST	ANT	PST	Extended PST	Total
Follow Up Kyphotic angle Code	0-5	Count	8	1	1	1	11
		% within Follow Up Kyphotic angle Code	72.7%	9.1%	9.1%	9.1%	100.0%
	6-10	Count	10	1	1	0	12
		% within Follow Up Kyphotic angle Code	83.3%	8.3%	8.3%	.0%	100.0%
	11-20	Count	5	2	2	0	9
		% within Follow Up Kyphotic angle Code	55.6%	22.2%	22.2%	.0%	100.0%
Total		Count	23	4	4	1	32
		% within Follow Up Kyphotic angle Code	71.9%	12.5%	12.5%	3.1%	100.0%

Translation: Patients vertebral level translation at the fracture site at presentation and post operative time as well as at follow up were assessed for correction of translation and subsequent loss of translation correction if any

The pre Op average translation was 1.54 and the average post op was o.64 which is statistically significant and average loss of translation reduction was 0.031 which was statistically insignificant and was not related to the type of surgery performed or the level of fractures fixed or whether or not the anterior column was reconstructed.

There was no significant difference between loss of correction of kyphosis and translation with regards to vertebral level or type of fracture or the number of level fixed or whether or not the anterior column was reconstructed

Loss of translation reduction

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	31	96.9	96.9	96.9
	<5	1	3.1	3.1	100.0
	Total	32	100.0	100.0	

Functional outcome

Most patients were independent and working. However, only 2 (6.2%) had gone to previous work requiring heavy manual labour. Most of them 26 (81.2%) were able to work as previously but with restraints. 3 (9.4%) of them had modified their work totally and one 1 (3.1%) was unable to work full time and was working part time.

Most of the patients had some degree of pain. One (3.1%) had absolutely no pain. Most of them, 26(81.2) had mild pain not requiring regular medication. 4(12.5%) had moderate pain requiring regular medication and 1 of them had severe pain requiring implant exit.

There was no significance deference in loss of reduction of kyphosis and translation with regards and type or fracture or level of fracture and also it was not significantly associated with FIM scores in paraplegics and Denis work scale in Non paraplegics

There was significant difference between Pre OP ASIA score and final FIM scores.

There was no significant difference between Pre Op Kyphotic angle and FIM score in patients with neurological deficit.

There was no difference between loss of correction of deformity and final FIM score or Denis work scale.

Fusion: All the patients had successful fusion.

Implant: One patient had screw breakage and presented after and required implant exit. Intra Op findings were indicative of solid fusion.

Type of surgeries:

Most of the surgeries in the study group was both anterior and posterior and that amounted for 23(71.9%) followed by anterior 4(12.5%) and posterior 4(12.5%) and 1 patient had extended posterior surgery.

Type of surgery code

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ANT & PST	23	71.9	71.9	71.9
	ANT	4	12.5	12.5	84.4
	PST	4	12.5	12.5	96.9
	Extended PST	1	3.1	3.1	100.0
	Total	32	100.0	100.0	

27 (87.5%) patients had reconstruction of the anterior column with Tri cortical bone graft alone being used for most patients 13(40.6%) followed by cage and bone graft in 9 (28.1%) percent and cage alone in 6(18.8%).

ACR code

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Nil	4	12.5	12.5	12.5
	TCBG	13	40.6	40.6	53.1
	Cage	6	18.8	18.8	71.9
	Cage +BG	9	28.1	28.1	100.0
	Total	32	100.0	100.0	

There was no significant association with ACR and no of level of vertebrae fixed or type of surgery performed and also between levels fixed and type of operation performed.

Complications:

4 patients had early complication which included UTI in one, blindness of left eye in one, cage mal position in one and transient neurological deficit in one.

4 patients had late complication which included significant backache and screw breakage requiring implant exit.

Three patients had significant back pain and one patient had screw breakage on follow up.

There was significant difference between Pre OP ASIA score and final FIM scores.

There was no significant difference between Pre Op Kyphotic angle and FIM score

There was no significant difference between loss of correction of kyphosis and translation with regards to vertebral level or type of fracture.

There was no difference between loss of correction of deformity and final FIM score or Denis work scale.

There was no significance deference in loss of reduction of kyphosis and translation with regards and type or fracture or level of fracture and also it was not significantly associated with FIM scores in paraplegics and Denis work scale in Non paraplegics

DISCUSSION

DISCUSSION

Mid Lumbar fractures represent a separate entity and they are more stable after a vertebral column injury because of their distinct sagittal contour, neurologic elements, and the iliolumbar ligaments.(6, 8, 9) It is lordotic in sagittal plane. The lumbar spine is more mobile than thoracic spine in flexion extension and lateral bending. There is restricted rotation in the lumbar spine due to the orientation of the lumbar facets which amounts to about 10 degrees compared to about 75 in the thoracic spine. Conus medullaris ends at lower end of L1 and in the mid lumbar level only the cauda equine lies which contains motor and sensory roots of the lumbo sacral myelomeres When there is neurological dysfunction in this area there is likelihood of spontaneous recovery. Therefore it simulates a peripheral-nerve injury which is not the case when cord or the conus medullaris is injured. There is no strong evidence supporting superiority of operation over non operative treatment with regards to long term functional outcome. Optimal treatment of mid lumbar fractures has been debatable and evidence based guidelines almost lacking. Spinal canal is widest at L2 level. Up to 90 per cent compromise in the cross-sectional area of the canal in this area has been associated with the no neurological deficit.(2)

The results of the operative treatment of the fractures of the mid lumbar region in this dissertation have been good. The restoration of spinal anatomy has been satisfactory, and the loss of kyphosis and translation acceptable. Patients have had good union and there was negligible pain at follow up.

Age group Affected

Most fractures were sustained in the age group between 20-40 years .The average age group was 29yrs. They were in the prime of their life and were in most cases the sole bread winners for the family. This finding was in keeping the multiple studies reported in the literature. Like the ones like Li-Yang Dai.(11) who reported an average of 32.4 years in his study and David A. (56) who reported an average of 31 years. The average age was slightly higher in the study by Eric A Seybold where it was 37.5 years. (57) This could be because most of our patients were fall from tree which is a commoner activity among relatively younger age group.

Gender:

Males were predominantly affected in our study as opposed to relatively proportionate involvement of both genders in studies from the west, though all the studies had higher number of male patients. This again is because climbing trees in our part of the world is more commonly a male activity and that road traffic accidents constituted a lesser number of our patients.

Gender	Eric A et al(57)	Li Yang Dai et al (11)	Our Study	David A et al (56)
Male	70%	79.6.%	93.8%	74.5.%
Female	30%	20.4%	6.2%	24.5%

Mechanism of injury:

Injuries sustained by our patients were different from the one sustained in the western patients. Most of them were due to work related fall from tree or fall into depth. This finding is in contrast to other studies from western literature. (54) where motor vehicle accident was a major factor

Mechanism Of injury	**Eric A et al(57)**	**Li Yang Dai et al (11)**	**Our Study**	**David A et al (56)**	**Panagoitis korosvessis et al(53)**
MVA	55.2%	44.44.%	12.5%	38.1%	63.3%
Fall from height	32.9%	40.74%	81.2%	30.9%	30.2%
Others	11.90%	14.82%	6.3	30%	6.5%

Associated injuries

The prevalence of associated injury in our patient was on the higher side (50%) with most of them being lower limb injuries (46%) as expected since the mechanism of injury for most was fall from height.

Associated injury	**Our Study**	**David A et al (56)**	**Ertürer E Tezer M(63)**
Lower Limb injuries	31.2%	22.1%	15%
Upper Limb Injuries	9.4%	25.9%	10%
Verterbal injuries	12.5%	15%	10%
Multiple injuries	9.4%	18%	15%

Neurologic outcome

Patients had undergone detailed neurological examination which was repeated after about 72 hours to see if the spinal shock wore off. Patients were assessed using ASIA impairment scale which is a standard tool to grade patients' neurological status. In our study 22 (68.75%) patients had neurological deficit and 11 (34.4%) were neurologically intact. 9(28.13%) patients had complete deficit where as 13(40.62%) had partial deficit in the follow up group and in the study group 32 (74.4%) patients had neurological deficit and 11 (25.6%) were neurologically intact. 12(27.9%) patients had complete deficit where as 20 (46.5%) had

partial deficit. This was in keeping the findings from the other studies reported to western literature.

Neurological Status	Eric A et al(57)	Li Yang Dai et al (11)	Our Study	David A et al (56)	Panagoitis korosvessis et al(53)
Intact	57.2%	48.1.%	46.5%	65.5%	62.5%
Incomplete	30.9%	48.4%	44.2%	31.5%	37.5%
Complete	11.90%	3.5%	9.3%	3%	0%

In patients with incomplete neurological injury , surgery achieving decompression and acceptable alignment have been proposed to improve the chance of neurological recovery in the literature (11,56,57). This is reflected also in our study in that the entire patient with partial neurological injury 12 (37.5%) had some recovery, most of them having complete recovery. Only 2 (6.2%) patients didn't have any recovery. 28.1% of patients had full recovery and 31.2% at partial recovery.(14,58,64) . Fedrickson (65)as well as Andreychick(55) had one patient each which didn't improve neurologically at all. Similar Mick et al(9) had one such patient with persistent deficit after 3 years of treatment. No patient had worsening of neurology except one who had transient worsening and recovered with watchful observation and steroid injection.

Functional outcome

All the patients who had neurological injury were given FIM scores at the time of discharge from the hospital after rehabilitation and at 3 months post Op and during subsequent follow ups. There was increasing trend of FIM score in subsequent visits. Most patients went back to working with slight modification of their previous job. This was reproduced in reports by Mick,(9) Seybold, (57)and Butler et al.(8) where above 83 percent of their patients were able to function well. FIM score was related to the Pre OP neurological status as expected and as seen in literature.(64)

Patients who have not had recovery of their bowel and bladder symptoms are doing intermittent self catheterization and digital evacuation of stools and are on stool softeners. They are on regular follow up with Department of physical medicine and Rehabilitation and are educated to recognize urinary tract infections early. The one with paraplegia are ambulant with the help of Knee Ankle Foot Orthosis and are independent of function.

Radiological outcome

The loss of Kyphosis was insignificant in our study which was similar to that of multiple studies in the literature. An HS, Butler and Seybold (4,8,14)reported similar findings. Andreychick and Finn also had similar findings. (3,55)

There was no psudoarthrosis in our study. Court- Brown had one in his.(64). We had one implant failure which required implant removal and vertebral segments had fused as per operative finding.

There was no association between the kyphosis, translation, functional and neurologic outcome. This is similar to the results of Finn, Kaminski, Defino.(66,67) and those of Seybold and andreychik .(56,57)

Complications

We had 4 early and four late complications. There was no infection.

12.5% of our patients had long term pain requiring pain medication and one (3.1%) had debilitating pain. We had blindness in one patient which didn't recover. One of our patients had mal positioned case requiring re operation. Huang reported one such case and a malpositioned screw and two screw breakages. (33)We had one patient with Urinary tract Infection and soakage of the wound post op which didn't require exploration. Our complications rates were comparatively lesser. An et al (66) had 2 pseudoarthrosis, 1 pulmonary embolism and 3 paralytic ileus which we didn't encounter. Kaminski(67) also had a post operative hematoma requiring drainage which we didn't have.

Our late Complication were screw breakage and persistent pain. Huang reported 2 screw breakages.(33)

Overall our complication rate was 25% , both early and late put together which is comparable to the complication rate obtained from systemic review of reports by An HS, Seybold, ,Fredrikson, Butt and Kaminski on lumbar fracture treatment. (7,14,57,65,67)

LIMITATIONS

LIMITATIONS OF THE STUDY

It was a retrospective study so the sample studied was not uniform

We didn’t have a control group to compare our results so we had to use existing similar studies from the literature to compare our results.

CONCLUSIONS

CONCLUSIONS

The operative stabilization allows early rehabilitation in patients with fractures of lumbar spine .

The choice of operation is dictated by the severity of injury.

The correction achieved in sagittal plane as well as reduction of translation achieved is maintained at the follow up averaging more than three years however they didn't have siginificant association with functional outcome.

Complication of prolonged recumbency far outweighs the few complications of surgery.

Improvement in the functional independence of the patient is seen as a result of early rehabilitation and ambulation.

Patients with partial neurological injury had better neurological outcome

Level of injury and type of fracture had no bearing on eventual functional outcome

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BIBLIOGRAPHY

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ANNEXURES

ANNEXURES

Proforma:

A retrospective study on functional and radiological outcome in patients operated for mid lumbar fractures of spine admitted to the spinal disorders unit of CMC Vellore from 2001-2010

Name

Hospital Number

Gender

Age

Address

Phone No.

Final Diagnosis Level

Associated injuries

Mode Of injury

Time to surgery

Steroid therapy

last intact sensory

last intact motor

last intact motor

Knee reflex

Ankle reflex

Plantar reflex

Anal wink

BCR

Pre Op ASIA score

Level of fracture

Type of fracture

Associated fracture in spine lamina

Associated fracture in spine facet

Associated fracture in spine TP

Other vertebral fractures

Other skeletal Injuries

Other non skeletal injuries

Which other non skeletal injuries

Pre Op Angle of kyphosis

Posterior vertebral height

Anterior vertebral height

Posterior vertebral Translation Ratio

Sagittal index

Above disc angle

Below disc angle

Disc height above

Disc height below

Operated

Why operated

Approach

Anterior Implant

Anterior No of levels instrumented

Ant No of levels fused

Posterior Implant

Posterior no. of Levels Instrumented

Post No of levels fused

What used for fusion

Blood loss

Duration of surgery

Intra Op complication dural tear

malpositioned implant

Wrong level

Pedicle break

Vascular complication

NG tube post Op

Why NG

Rupture of Pleura

Repeat surgery

Wound inspection day

Delayed wound healing

H.D.U/I.C.U care

Post Op Angle of kyphosis

PV height

AV height

PVTR

sagittal Index

Above disc angle

Below disc angle

Disc height above

Disc height below

Levels

Which implant?

Implant malpositioning x ray

Implant malpositioning CT

Implant death

Total hospital stay

Approximate cost

When ambulated

With support

Without support

Rehabilitation

How long

Time for Neurological recovery

Time for fusion

6 months Post Op Angle of kyphosis

Posterior vertebral height

Anterior vertebral height

Posterior vertebral Translation Ratio

Sagittal index

Above disc angle

Below disc angle

Disc height above

Disc height below

Loss of correction of kyphosis

CT scan

Canal compromise

Percentage gained

Fusion anterior

Fusion posterior

Flexion and extension X ray - fusion Flexion and extension x ray - movement fusion

ASIA score

FIM score

Denis pain score

Denis work score

2 yr Follow

Angle of kyphosis

Angle

Posterior vertebral height

Anterior vertebral height

Posterior vertebral Translation Ratio

Sagittal index

Above disc angle

Below disc angle

Disc height above

Disc height below

Loss of correction of kyphosis

CT scan

Canal compromise

Percentage gained

Fusion anterior

Fusion posterior

Flexion and extension X ray - fusion Flexion and extension x ray - movement fusion

ASIA score

FIM score

Denis pain score

Denis work score

FIM

FUNCTIONAL INDEPENDENCE MEASURETM AND FUNCTIONAL ASSESSMENT MEASURE

Scale:

7 Complete Independence (timely, safely) *(Patient Stamp)*

6 Modified Independence (extra time, devices)

5 Supervision (cuing, coaxing, prompting)

4 Minimal Assist (performs 75% or more of task)

3 Moderate Assist (performs 50%-74% of task)

2 Maximal Assist (performs 25% to 49% of task)

1 Total Assist (performs less than 25% of task)

SELF CARE ITEMS

1. Feeding

2. Grooming

3. Bathing

4. Dressing Upper Body

5. Dressing Lower Body

6. Toileting

7. Swallowing*

SPHINCTER CONTROL

8. Bladder Management

9. Bowel Management

MOBILITY ITEMS (Type of Transfer)

10. Bed, Chair, Wheelchair _____

11. Toilet _____

12. Tub or Shower _____

13. Car Transfer* _____

LOCOMOTION

14. Walking/Wheelchair (circle)

15. Stairs

16. Community Access*

COMMUNICATION ITEMS

17. Comprehension-Audio/Visual (circle)

18. Expression-Verbal, Non-Verbal (circle)

19. Reading*

20. Writing*

21. Speech Intelligibility*

PSYCHOSOCIAL ADJUSTMENT

22. Social Interaction

23. Emotional Status*

24. Adjustment to Limitations*

25. Employability*

COGNITIVE FUNCTION

26. Problem Solving

27. Memory

28. Orientation*

29. Attention*

30. Safety Judgment*

*FAM items

ASIA SCALE

MUSCLE GRADING

0 total paralysis

1 palpable or visible contraction

2 active movement, full range of motion, gravity eliminated

3 active movement, full range of motion, against gravity

4 active movement, full range of motion, against gravity and provides some resistance

5 active movement, full range of motion, against gravity and provides normal resistance

5* muscle able to exert, in examiner's judgment, sufficient resistance to be considered normal if identifiable Inhibiting factors were not present

NT - not testable. Patient unable to reliably exert effort or muscle unavailable for testing due to factors such as immobilization, pain on effort or contracture.

ASIA IMPAIRMENT SCALE

A = Complete: No motor or sensory function is preserved in the sacral segments S4-S5.

B = Incomplete: Sensory but not motor function is preserved below the neurological level and includes the sacral segments S4-S5.

C = Incomplete: Motor function is preserved below the neurological level, and more than half of key muscles below the neurological level have a muscle grade less than 3.

D = Incomplete: Motor function is preserved below the neurological level, and at least half of key muscles below the neurological level have a muscle grade of 3 or more.

E = Normal: Motor and sensory function are normal.

CLINICAL SYNDROMES

(OPTIONAL)

Central Cord

Brown-Sequard

Anterior Cord

Conus Medullaris

Cauda Equina

STEPS IN CLASSIFICATION

The following order is recommended in determining the classification of individuals with SCI.

1. Determine sensory levels for right and left sides.

2. Determine motor levels for right and left sides.

Note: in regions where there is no myotome to test, the motor level is presumed to be the same as the sensory level.

3. Determine the single neurological level.

This is the lowest segment where motor and sensory function is normal on both sides, and is the most cephalad of the sensory and motor levels determined in steps 1 and 2.

4. Determine whether the injury is Complete or Incomplete

(sacral sparing).

If voluntary anal contraction = No AND all S4-5 sensory scores = 0

AND any anal sensation = No, then injury is COMPLETE.

Otherwise injury is incomplete.

5. Determine ASIA Impairment Scale (AIS) Grade:

Is injury Complete? If YES, AIS=A Record ZPP (For ZPP record lowest dermatome or myotome on each side with some (non-zero score) preservation)

Is injury motor incomplete? If NO, AIS=B

(Yes=voluntary anal contraction OR motor function more than three levels below the motor

level on a given side.)

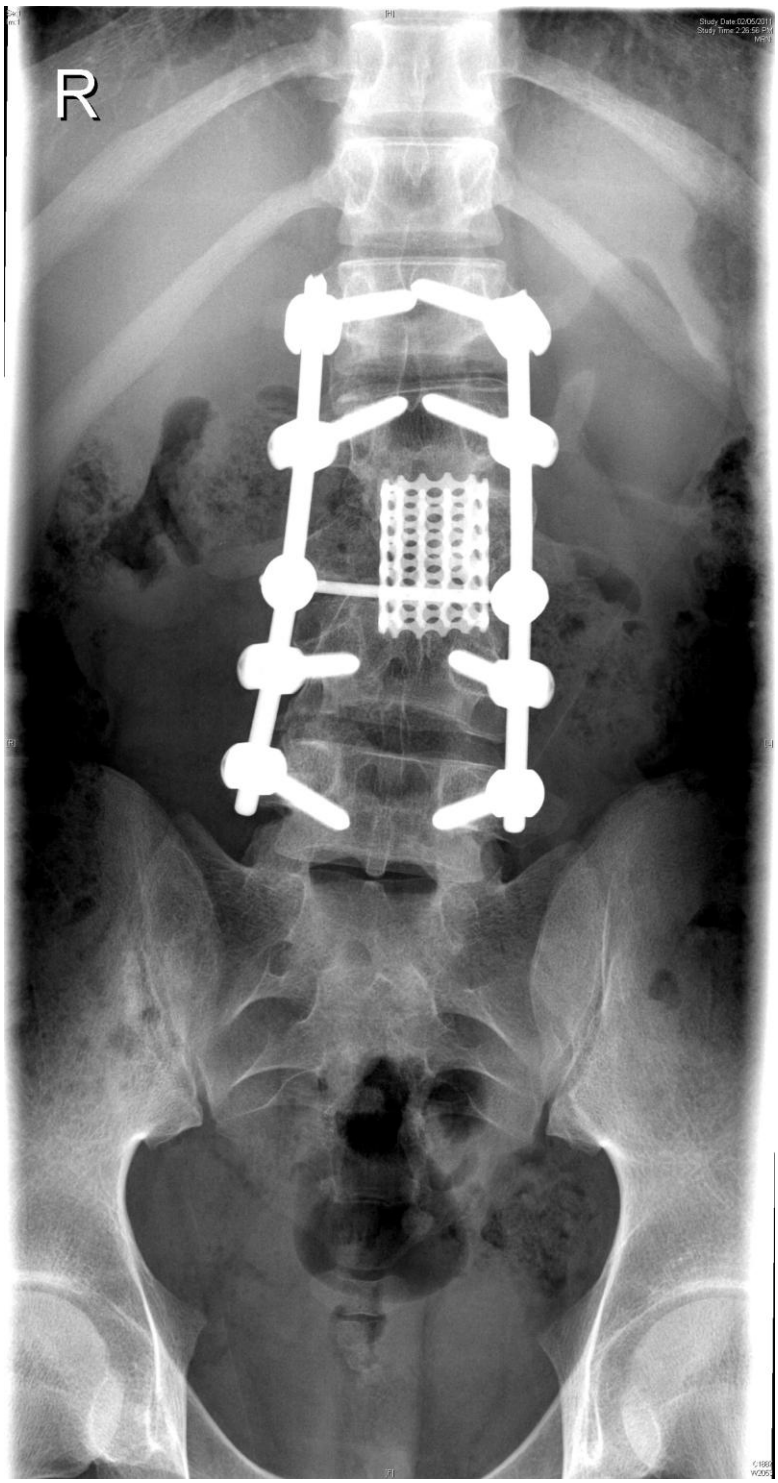
Are at least half of the key muscles below the (single) neurological level graded 3 or better?

AIS=C AIS=D

If sensation and motor function is normal in all segments, AIS=E

Note: AIS E is used in follow up testing when an individual with a documented SCI has recovered normal function. If at initial testing no deficits are found, the individual is neurologically intact; the ASIA Impairment Scale does not apply.

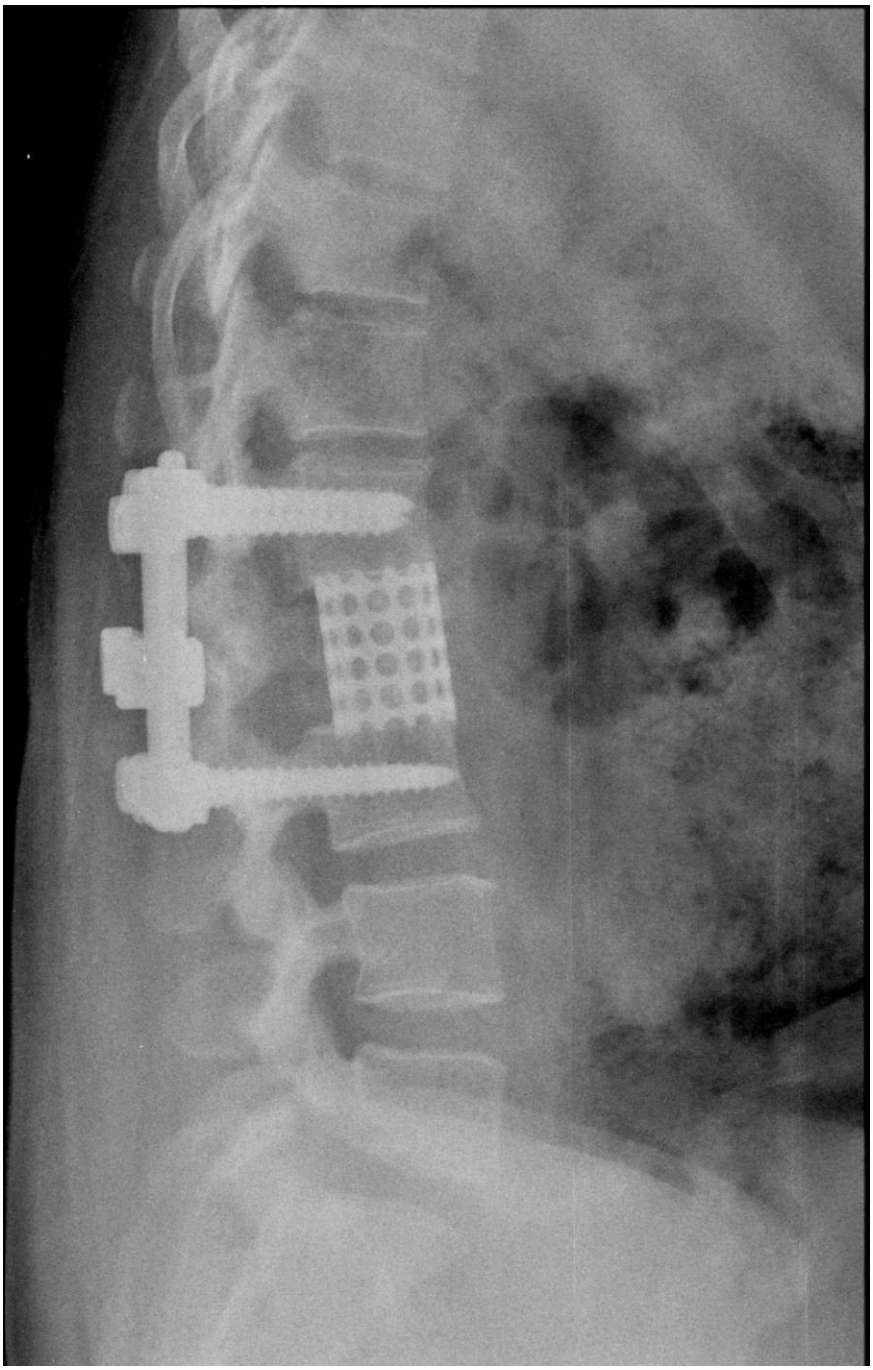
Patient Images



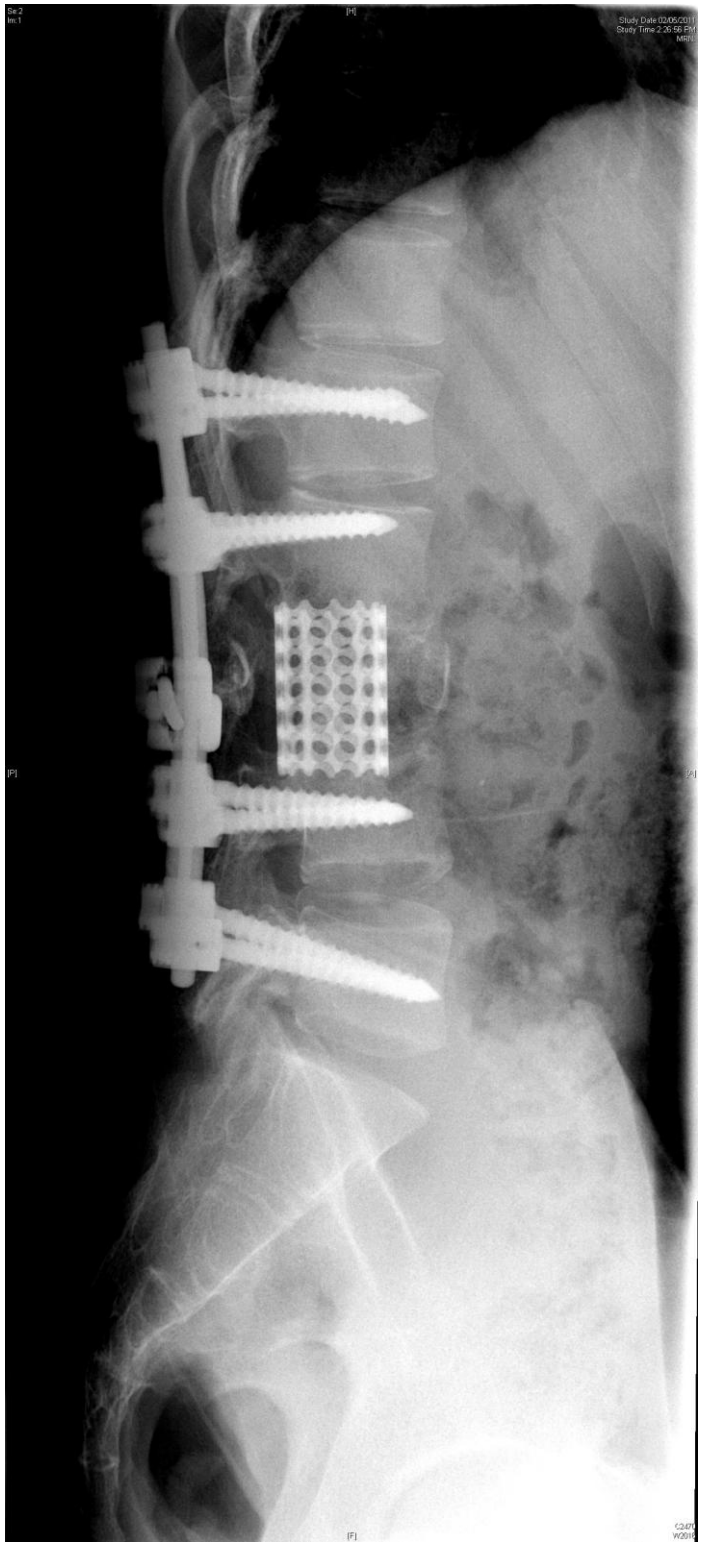
Post Instrumentaion and Cage AP

Example of Lateral X ray in Extension

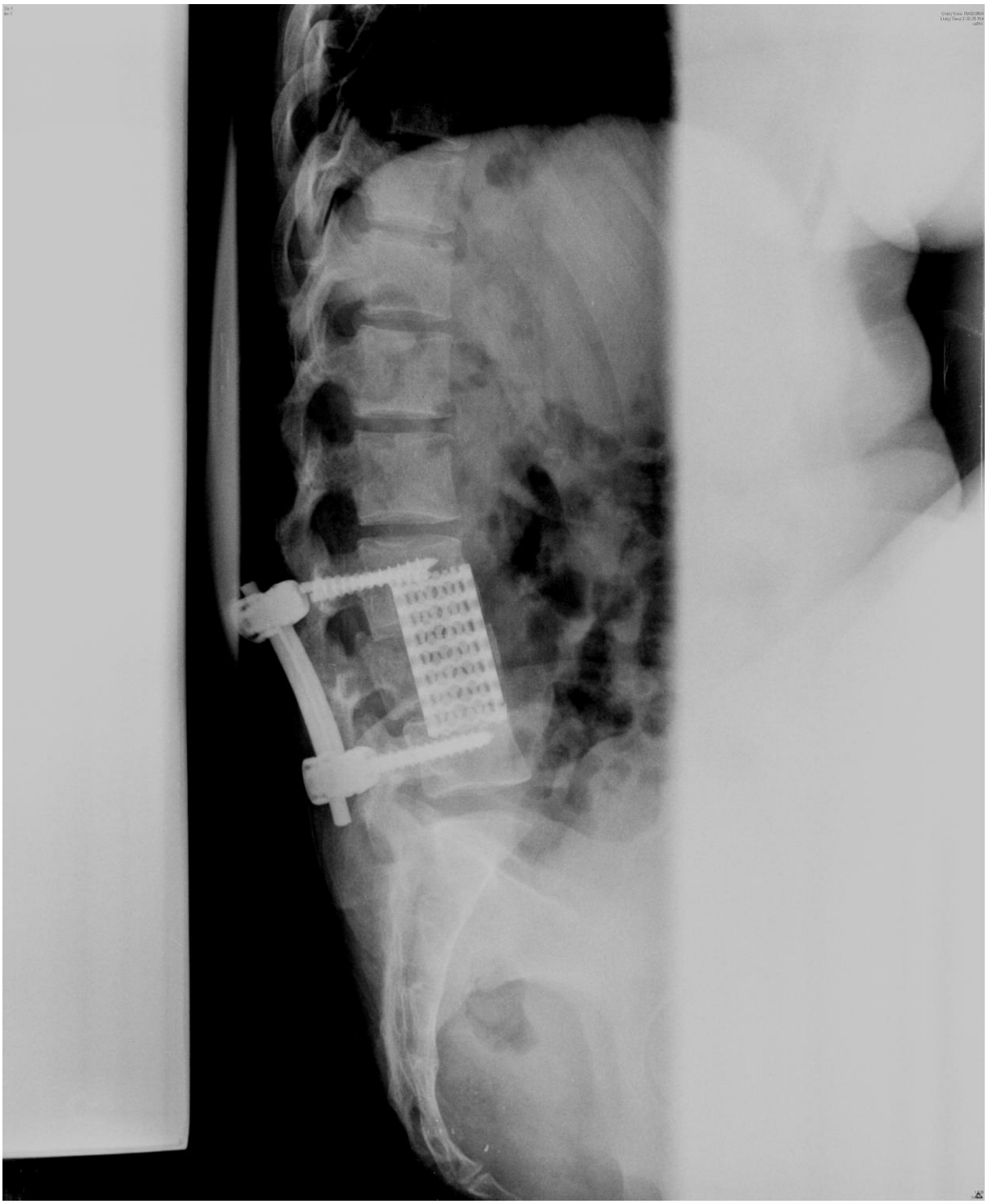
Example of Lateral X ray In flexion



Post. Instrumentation with cage for ant. Reconstruction LAT



Posterior instrumentation and cage Lateral



Screw Breakage – Lateral

Standing - paraplegic, Initial Rehabilitation

Learning to walk on Parallel bars

KAFO

Data Sheets

Sno	H No	age	Age Code	gender	Min F/U	Marital status	occupation	income	education	Date OF injury	Date Surgery	TOH	TOR
1	384079D	21	2	M	38	Unmarried	partly skilled occupation	5000	school	12/27/2008	1/9/2009	13	14
2	068018D	23	2	M	41	Married	partly skilled occupation	4000	school	7/23/2007	7/27/2007	1	4
3	770504B	29	2	M	42	Unmarried	partly skilled occupation	4000	school	5/27/2007	5/31/2007	1	4
4	006868D	27	2	M	50	Unmarried	partly skilled occupation	3500	school	4/10/2007	4/17/2007	4	7
5	025693D	28	2	M	41	Married	partly skilled occupation	4000	school	5/13/2007	5/15/2007	1	2
6	580573C	42	4	M	40	Married	unskilled occupation	2,000	Illeterate	2/1/2005	1/21/2005	8	9
7	250099D	31	3	F	38	Married	professional occupation	15,000	college	5/24/2008	6/3/2008	7	9
8	823728C	25	1	M	39	Married	unskilled occupation	5000	school	5/20/2006	5/30/2006	2	10
9	855907C	23	1	M	63	Unmarried	unemployed	3000	school	02.05.2006	16.07.2006	71	74
10	366095D	22	1	M	34	Unmarried	unemployed	6,000	school	11/20/2008	12/15/2012	14	25
11	450365D	40	3	M	40	Married	unskilled occupation	4000	school	4/27/2009	5/5/2009	1	8
12	626854C	24	2	M	60	Married	non manual skilled	15,000	school	05.04.2005	27.4.2005.	20	22
13	562239C	26	2	M	80	Married	partly skilled occupation	1,500	Illeterate	12/6/2004	12/7/2004	1	1
14	125189D	26	2	M	35	Unmarried	partly skilled occupation	5,000	school	25.10.07	31.10.07	2	6
15	856432C	24	2	M	44	Unmarried	unemployed	4,000	college	16.7.2006	25.7.2006	7	9
16	416752D	19	1	M	26	Unmarried	unemployed	25,000	school	2/16/2009	02.03.2009	16	17
17	993959B	39	3	M	137	Married	unskilled occupation	2,500	Illeterate	03/20/2001	03/24/2001	2	5
18	999243C	20	1	M	50	Unmarried	partly skilled occupation	4,000	school	3/27/2007	4/5/2007	1	8
19	971437C	31	3	M	41	Married	partly skilled occupation	15000	school	10.02.2007	16.02.2007	2	6
20	310023D	32	3	M	26	Married	partly skilled occupation	3000	school	8.09.2008	13.09.2008	1	5
21	818795C	34	3	M	34	Unmarried	unskilled occupation	3,000	school	05/13/2006	05/24/2006	1	10
22	636273C	32	3	M	50	Married	partly skilled occupation	2,000	school	05/17/2005	05/20/2005	2	4
23	686185D	21	1	M	27	Unmarried	unemployed	4500	college	4/29/2010	5/2/2010	1	2
24	772289o	39	1	M	26	Married	professional occupation	50,000	college			1	1
25	856462C	20	1	F	24	Married	unemployed	5000	school	22.7.2006	25.7.2006	2	3
26	400280C	57	5	M	24	Married	partly skilled occupation	5000	school	1/3/2004	1/11/2004	1	8
27	720576C	23	2	M	24	Unmarried	unemployed	5000	school	10/23/2005	28/10/2005.	3	5
28	040510D	24	1	M	24	Unmarried	unemployed	5000	school	6/6/2007	6/20/2012	3	4
29	818887C	40	3	M	24	Married	partly skilled occupation	5,000	school	5/15/2006	5/24/2006	2	9
30	488402C	40	3	M	24	Married	partly skilled occupation	5000	school	3/24/2007	3/26/2007	30	32
31	148925C	27	2	M	25	Married	partly skilled occupation	5,000	school	4/12/2002	5/1/2012	20	23
32	690276C	39	3	M	25	Married	partly skilled occupation	4,000	school	08.08.2005	28.09.2005.	48	49

Sno	Days of hospitalisation	Days of hosp post OP	Mode of inury	Height (ft)	MOI code	FINAL DIAGNOSIS	Denis Code
1	23	22	FALL FRM HT - 3 STOREYS 30 FT	30	1	L3 BURST FRACTURE	2
2	7	4	FALL FRM HT 10 FT	10	1	L2 BURST FRACTURE	2
3	8	5	FALL FROM HT 2FT	2	1	L2 FDI	3
4	10	7	FALL FROM HT 20M	50	1	L3 BURST FRACTURE	2
5	15	14	FALL FROM HT - TREE 30 FT	30	1	L2 FD INJURY	3
6	11	2	Heavy object		2	L2 COMPRESSION FRACTURE	1
7	14	12	FALL FROM HT - 15 FT	15	1	L2 FD (ASIA C)	4
8	13	5	FALL FROM HT - TREE 30 FT	30	1	L1L2 BURST	2
9	12	9	FALL INTO THE PIT - 25FT	25	1	l3 FDI	3
10	21	10	FALL FROM HT	40	1	L2 FDI	3
11	14	7	FALL FROM HT- COCONUT TREE	20	1	L2 FDI	3
12	8	6	RTA - 2 WHEELER		3	L4 BURST FRACTURE	2
13	7	7	FALL FROM HEIGHT	20	1	L2 FRACTURE DISLOCATION	4
14	13	9	FALL FROM HT - 15 FT	15	1	L3 BURST FRACTURE	2
15	12	10	RTA - 2 WHEELER		3	L2 FDLN	4
16	21	20	FALL FRM HT - STUDYING	20	1	L3 BURST FRACTURE	2
17	8	5	Fall	20	1	L2 BURST FRACTURE	2
18	12	5	RTA - 2 WHEELER		3	L2FDI	3
19	11	7	FALL FROM HEIGHT - 20 ft	20	1	L3 BURST FRACTURE	2
20	13	9	FALL FROM HEIGHT - 20 ft	20	1	L3 BURST FRACTURE	2
21	20	11	Heavy object		1	L2 BURST FRACTURE	2
22	8	6	fall	20	1	L2 burst	2
23	17	16	FALL FROM HT COCONUT TREE	20	1	L3 BURST FRACTURE	2
24	10	10	RTA - 2 WHEELER		3	L3 burst FRACTURE	2
25	29	28	fall from height	30	1	L2 L3 FRACTURE DISLOCATION	4
26	15	8	fall from her balcony (10 - 12ft)	10	1	L2 ant comp fract	1
27	8	6	FALL FROM HT 40 M HOSTEL	10	1	L2 BURST FRACTURE	2
28	15	14	FALL INTO A DITCH 30FT	30	1	L1 AND L4 BURST	2
29	15	8	FALL FROM TREE - 20 ft	10	1	L2 BURST	2
30	4	2	FALL FROM HT - 20FT	20	1	L2 BURST	2
31	7	4	fall from height	20	1	L4 compression fracture	1
32	7	6	COAL MINE ACCIDENT		2	L2 BURST	2

Sno	VL	VL Code	ass vert injury	ASS sklt and non sktl INJ	Associated injuries code	ASIA Pre OP	Asia Pre OP CODE
1	l3	2	nil	RT MM FRAC	1	A	1
2	l2	1	nil	nil	0	D	4
3	l2	1	nil	nil	0	D	4
4	l3	2	nil	nil	0	A	1
5	l2	1	nil	OPEN # DIS LEFT ANKLE AND FOOT	1	E	5
6	L2	1	nil	nil	0	A	1
7	l2	1	nil	nil	0	C	3
8	l2	1	l1	nil	0	E	5
9	l3	2	nil	nil	0	C	3
10	l2	1	nil	nil	0	C	3
11	l2	1	nil	nil	0	E	5
12	l4	3	nil	nil	0	D	4
13	L2	1	nil	Left hip dislocation	1	A	1
14	L3	2	nil	RIGHT CALCANEAL FRACTURE	1	E	5
15	l2	1	T12	RIGHT MM AND TALUS FRAC	1	A	1
16	l3	2	nil	RIGHT CALC, LEFT DIST RADIUS	1	C	3
17	L2	1	nil	nil	0	E	5
18	l2	1	nil	EXT lung CONTUSION (L) (L) HAEMOTHORAX LIVER LACERATI	4	E	5
19	l3	2	nil	Rt DISTAL RADIUS BILATERAL CALCANEU FRACTURE	4	E	5
20	l3	2		nil	0	D	4
21	l2	1	L1 spinous process	nil	0	C	3
22	L2	1	nil	Bladder rupture	3	B	2
23	l3	2	nil	B/L DISTAL RADIUS FRACTURE	2	A	1
24	l3	2	nil	right leg Open distal BB fracture	1	E	5
25	l2	1	nil	Lf acetab, , pubic rami, calcaneum fracture and head injury	4	A	1
26	l2	1	nil	montaggia variant - left	2	E	5
27	l2	1	nil	nil	0	A	1
28	l4	3	L1 BURST,	BILATERAL CALCANEAL	1	E	5
29	l2	1	nil	nil	0	A	1
30	l2	1	nil	RT DISTAL RADIUS FRACTURE	2	D	4
31	l4	3	nil	Right MM fracture	1	E	3
32	l2	1	nil	RIGHT ANKLE OPEN FRACTURE	1	C	3

Sno	ASIA FINAL	ASIA final Code	Recovery Code	Rehab consultation	Post Rehab FIM Score	FIM Final Score	Dennis pain scale	Denis work scale
1	D	4	1	1	120	122	3	2
2	E	5	2	2	126	126	2	2
3	E	5	2	2	124	126	3	2
4	A	1	0	1	122	122	2	2
5	E	1	3	2	126	126	2	1
6	D	4	1	1	120	122	2	2
7	D	4	1	1	126	126	2	2
8	E	5	2	2	126	126	1	1
9	D	4	1	2	126	126	2	2
10	D	4	1	1	120	124	2	3
11	E	5	3	2	126	126	2	2
12	E	5	2	2	126	126	2	2
13	A	1	0	1	77	80	4	4
14	E	5	3	2	126	126	2	2
15	C	3	1	1	112	120	3	3
16	D	4	1	1	124	126	2	2
17	E	5	3	1	126	126	2	2
18	E	5	3	1	126	126	2	2
19	E	5	3	1	124	126	2	2
20	E	5	2	2	124	124	2	2
21	E	5	2	1	90	124	2	2
22	E	5	2	1	90	105	2	2
23	B	2	1	1	120	122	2	2
24	E	5	3	1	126	126	2	2
25	E	5	2	1	122	122	2	2
26	E	5	3	2	126	126	2	2
27	C	3	1	1	118	120	2	2
28	E	5	3	1	126	126	2	2
29	B	2	1		116	118	3	3
30	E	5	2	1	126	126	2	2
31	E	5	3	2	126	112	2	2
32	E	5	2	2	124	124	2	2

Sno	Follow Up Kyphotic angle Code	Loss of Kyphosis	Loss of Kyphosis Code	VBTR - Pre Op	VBTR - Pre Op Code	Post Op translation	Post Op translation - code
1	1	6	2	0	0	0	0
2	2	8	2	0	0	0	0
3	1	3	1	5	1	0	0
4	1	1	1	0	0	0	0
5	3	4	1	3	1	0	0
6	2	7	2	0	0	0	0
7	2	0.3	1	3	1	0	0
8	1	0.1	1	0	0	0	0
9	2	0.1	1	10	2	3	1
10	3	1	1	8	2	3	1
11	2	1	1	2	1	0	0
12	1	0.2	1	0	0	0	0
13	1	0	1	15	3	4	1
14	3	1.2	1	0	0	0	0
15	2	2.6	1	15	3	0	0
16	2	2.4	1	0	0	0	0
17	1	0	1	0	0	0	0
18	3	3.4	1	3	1	3	1
19	2	2.5	1	0	0	0	0
20	3	2.2	1	0	0	0	0
21	2	2	1	Nil	0	0	0
22	1	0	1	0	0	0	0
23	2	5	1	5	1	0	0
24	3	1.5	1	0	0	0	0
25	1	1.7	1	5	1	3	0
26	1	1	1	0	0	0	0
27	1	1	1	0	0	0	0
28	3	3	1	0	0	0	0
29	3	9.6	2	0	0	0	0
30	2	0.4	1	4	1	0	0
31	3	8.7	2	3	1	5	1
32	2	2.5	1	0	0	0	0

Sno	Loss of trasnlation reduction	APPROACH	Approach Code	Type of surgery	Type of surgery code	IMPLANTS USED	LEVELS Fixed
1	0	P FB A	1	ap	1	PS HC	3
2	0	P FB A	1	ap	1	PS	2
3	0	P FB A	1	ap	1	PS	2
4	0	A	2	a	2		2
5	0	p	3	p	2	PS	2
6	0	P FBA	1	ap	1	PS	2
7	0	P FBA	1	ap	1	PS	2
8	0	P FBA	1	ap	1	ps	3
9	0	P FBA	1	ap	1	ps	2
10	0	P FBA	1	ap	1	ps	2
11	0	P	3	p	3	ps	2
12	0	PFBA	1	ap	1		2
13	0	PFBA	1	ap	1	PS	2
14	0	A	2	a	2	ps	2
15	0	PFBA	1	ap	1	PS CAGE	2
16	0	PFBA	1	ap	1	PS CAGE	2
17	0	p	3	p	3		2
18	0	p	3	p	3	PS	2
19	0	PFBA	1	ap	1	PS	3
20	0	PFBA	1	ap	1	ps	2
21	0	PFA	1	ap	1	ps	2
22	0	P	3	ep	4	ps	3
23	0	P FB A	1	ap	1	PS,CAGE	3
24	0	PFA	1	ap	1	PS	2
25	0	pfba	1	ap	1	ps	3
26	0	PFA	1	ap	1	ps	3
27	0	P FB A	1	ap	1	GESCO PS, AND CAGE	2
28	0	PFBA	1	ap	1	PS	4
29	0	P FBA	1	ap	1	PSF	2
30	0	A	2	a	2	RODS AND SCREWS	2
31	1	p	3	p	3	PS	2
32	0	PFBA	1	ap	1	ps	2

Sno	ACR	ACR code	Early Complication	Early Complication	Late Complication	Late Complication Code	Union achieved	Min F/U
1	cage and BG	3	UTI, Wound soakage - abm	1	nil	2	1	38
2	tcbg	1	nil	2	nil	2	1	41
3	tcbg	1	nil	2	nil	2	1	42
4	cage	2	nil	2	nil	2	1	50
5	nil	0	nil	2	nil	2	1	41
6	tci	1	nil	2	nil	2	1	40
7	cagebg	3	nil	2	nil	2	1	38
8	bg	1	nil	2	nil	2	1	39
9	cage bg	3	nil	2	nil	2	1	63
10	cage	2	nil	2	Back ache	1	1	34
11	nil		nil	2	nil	2	1	40
12	tcbg	1	nil	2	nil	2	1	60
13	tci	1	nil	2	Back ache	1	1	80
14	icbg	1	nil	2	nil	2	1	35
15	cage bg	3	nil	2	nil	2	1	44
16	cage	2	1 - 3m - cage repositioning, re fixation	1	nil	2	1	26
17	nil		nil	2	nil	2	1	137
18	nil		nil	2	nil	2	1	50
19	cage	2	nil	2	nil	2	1	41
20	caga bg	3	nil	2	nil	2	1	26
21	tcbg	1	blindness left eye	1	nil	2	1	34
22	tcbg	1	nil	2	Back ache	1	1	50
23	cage and BG	3	nil	2	nil	2	1	27
24	TCI	1	nil	2	nil	2	1	26
25	bg	1	nil	2	nil	2	1	24
26	tcbg	1	nil	2	nil	2	1	24
27	cage and BG	3	nil	1	nil	2	1	24
28	bg	1	Early second operation	2	nil	2	1	24
29	cagebg	3	nil	2	nil	2	1	24
30	cagebg	3	nil	2	nil	2	1	24
31	cage	2	nil	2	screw brakage	1	1	24
32	bg	2	nil	2	nil	2	1	24

PATIENT INFORMATION SHEET

Study Title: **A retrospective study on functional and radiological outcome in patients operated for mid lumbar fractures of spine admitted to the spinal disorders unit of CMC Vellore from 2001- 2010**

Subject's Name:

Hospital Number:

This is a study to assess the outcome of fracture you have sustained in the vertebral column. Your fracture would have been treated operatively required due to the nature of your injury.

To see how well you have done following the injury, a doctor will examine your back, we will also take X-rays of your back. To check the function of the vertebral column, we will ask you to perform a few activities like bending forwards, sideways, and we will also have to check your muscle power and sensation as well as per rectal examination which will be done using a gloved finger in your rectum. We will also request you to fill a questionnaire to assess any difficulty you face when performing various activities of daily living. All the tests are simple, and constitute no danger to you. The assessment will help us assess our current treatment protocol.

The assessment will take about 1 hour. You will not be exposed to any injury/discomfort during the assessment. You will not have to bear any expenses for the assessment or for any x-ray taken.

Your participation is entirely voluntary and you are free to opt out of the study at any time. This will not affect your treatment. This study is funded by our institutional research board, and we do not receive any external funding for this study. The information gathered from the study will be kept anonymous. Individual details will not be disclosed.

If you should have any queries related to the trial you can contact Dr.Bhim Bahadur from the Department of Orthopaedics.

The contact numbers is as below:
Dr Bhim Bahadur Harijan:
mobile : 9894682128
Office – 0416 2282020
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INFORMED CONSENT

Study Title: **A retrospective study on functional and radiological outcome in patients operated for mid lumbar fractures of spine admitted to the spinal disorders unit of CMC Vellore from 2001- 2010**

Study Number:

Subject's Name:

Date of Birth / Age:_____

Please initial box (to be filled by the patient)

(i) I confirm that I have read and understood the information sheet dated _____ for the above study and have had the opportunity to ask questions. [ ]
(ii) I understand that my participation in the study is voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care or legal rights being affected. [ ]
(iii) I understand that the Sponsor of the clinical trial, others working on the Sponsor's behalf, the Ethics Committee and the regulatory authorities will not need my permission to look at my health records both in respect of the current study and any further research that may be conducted in relation to it, even if I withdraw from the trial. I agree to this access. However, I understand that my identity will not be revealed in any information released to third parties or published. [ ]
(iv) I agree not to restrict the use of any data or results that arise from this study provided such a use is only for scientific purpose(s) [ ]
(v) I agree to take part in the above study. [ ]

Signature (or Thumb impression) of the Subject/Legally Acceptable Representative:_____
Date: _____/_____/_____
Signatory's Name: _____

Signature of the Investigator: _____
Date: _____/_____/_____
Study Investigator's Name: _____

Signature of the Witness: _____
Date:_____/_____/_____
Name of the Witness: _____

INSTITUTIONAL REVIEW BOARD (IRB)

CHRISTIAN MEDICAL COLLEGE

VELLORE - 632 002, INDIA.

Dr. George Thomas, D.Orth
Editor, Indian Journal of Medical Ethics
Chairman, Ethics Committee

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Deputy Chairperson, Ethics Committee

Dr. L. Jeyaseelan, MSc, PhD
Secretary, Research Committee, IRB

Dr. George Mathew, MS, MD, FCAMS
Chairman, Research Committee &
Principal

Dr. Gagandeep Kang, MD, PhD, FRCPath
Deputy Chairperson
Secretary, Ethics Committee, IRB,
Additional Vice Principal (Research)

December 14, 2010

Dr. Bhim Bahadur Harijan
PG Registrar
Department of Ortho 1 & Spinal Disorder Surgery
Christian Medical College
Vellore 632 004

Sub: **FLUID Research grant project NEW PROPOSAL:**
Functional and radiological outcome in patients with mid lumbar fractures admitted in spinal disorders surgery unit of CMC Vellore from 2000 – 2010 managed with various treatment modalities.
Dr. Bhim Bahadur Harijan, PG Registrar, Ortho 1 & Spinal Disorder Surgery,
Dr. G.D. Sundararaj, Dr. K. Venkatesh, Ortho 1 & Spinal Disorder Surgery.

Ref: IRB Min. No. 7321 dated 20.10.2010

Dear Dr. Harijan,

The Institutional Review Board (Ethics Committee) of the Christian Medical College, Vellore, reviewed and discussed your project entitled "Functional and radiological outcome in patients with mid lumbar fractures admitted in spinal disorders surgery unit of CMC Vellore from 2000 – 2010 managed with various treatment modalities" on October 20, 2010.

The Committees reviewed the following documents:

1. Format for application to IRB submission
2. Informed Consent Form (Tamil, Hindi, Telugu and Bengali)
3. A CD containing document 1 – 3

The following Ethics Committee members were present at the meeting held on October 20, 2010 at 10:00 am in the CREST/SACN Conference Room, Christian Medical College, Bagayam, Vellore 632002.

Name	Qualification	Designation	Other Affiliatio
Dr. George Mathew	MBBS, MS, MD	Principal, C.M.C.	

INSTITUTIONAL REVIEW BOARD (IRB)

CHRISTIAN MEDICAL COLLEGE

VELLORE - 632 002, INDIA.

Dr. George Thomas, D.Orth
Editor, Indian Journal of Medical Ethics
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Dr. Shuba Kumar, PhD
Deputy Chairperson, Ethics Committee

Dr. L. Jeyaseelan, MSc, PhD
Secretary, Research Committee, IRB

Dr. George Mathew, MS, MD, FCAMS
Chairman, Research Committee &
Principal

Dr. Gagandeep Kang, MD, PhD, FRCPath
Deputy Chairperson
Secretary, Ethics Committee, IRB,
Additional Vice Principal (Research)

Mrs. Mary Johnson (on behalf of Mrs. Sundari Edwin)	M.Sc. (Nursing)	Nursing Superintendent, CMC.	
Mrs. Shirley David (on behalf of Mrs. Rosaline Jayakaran)	M.Sc. (Nursing), RN RM	Dean, College of Nursing, CMC.	
Rev. Malhia Joshua	MA, MEd, MTh, PhD	Chaplain, CMC	
Mr. Harikrishnan	BL.	Lawyer	Non-CMC Staff
Mr. Samuel Abraham	MA, PGDBA, PGDPM, M.Phil, BL.	Legal Advisor, CMC.	
Dr. Sujith Chandy	MBBS, MD	Professor, Pharmacology Dept. CMC.	
Dr. Srinivas Babu	MSc, Ph.D.	Sr. Scientist, Neurological Sciences, CMC.	
Mrs. S. Pattabiraman	BSc, DSSA	Social Worker, Vellore	Non-CMC Staff
Dr. P. Zachariah	MBBS, PhD	Retired Professor , Vellore	Non-CMC Staff
Dr. Gagandeep Kang	MD, PhD, FRCPath.	Secretary IRB (EC)& Dy. Chairperson (IRB), Professor of Microbiology & Addl. Vice Principal (Research), CMC.	

We approve the project to be conducted in its presented form.

The Institutional Ethics Committee / Independent Ethics Committee expects to be informed about the progress of the project, any SAE occurring in the course of the project, any changes in the protocol and patient information/informed consent and asks to be provided a copy of the final report.

A sum of ₹ 76,800/- (Rupees Seventy Six thousand Eight Hundred only) is sanctioned for 2 years out of which a maximum of Rs. 1,500/- can be spent for stationery, printing, Xeroxing and computer charges (if computers used are within the institution).

Yours sincerely,

Dr. L. Jeyaseelan, PhD
Secretary (Research Committee)
Institutional Review Board

SECRETARY,
Institutional Review Board
(Research Committee)
Christian Medical College,
Vellore - 632 002, Tamil Nadu, India.

TEL : 0416 - 2284294, 2284202 FAX : 0416 - 2262788, 2284481 e-mail : research@cmcvellore.ac.in

விவரிக்கப்பட்ட ஒப்புதல்

ஆய்வு தலைப்பு:

ஆய்வு எண்:

நோயாளியின் பெயர்:

பிறந்த தேதி / வயது

நோயாளி பூர்த்தி செய்ய வேண்டியவை:

(i) ____ தேதியன்று அளிக்கப்பட்ட ~~நோயாளி விவரப்பட்டியல்~~ ~~தானே மேற்கண்ட~~ ~~ஆய்விற்காக~~ ~~என்பதையும், கேள்விகள்~~ ~~கேட்கு விளக்கம் பிற எனக்கு~~ அனுமதி.

(i) ____ தேதியன்று அளிக்கப்பட்ட மேற்கண்ட ஆய்விற்கான விவரப்பட்டியல் தானை நான் படித்து புரிந்து கொண்டேன் என்றும் கேள்விகள் கேட்டு மேலும் விளக்கம் பெற சந்தர்ப்பம் இருந்தது என்றும் உறுதியளிக்கிறேன்.

(ii) இந்த ஆய்வில் என்னுடைய பங்கேற்பு தன்னார்வமானது என்பதையும் நான் எந்நேரத்திலும் விலகிக் கொள்ளலாம் என்றும், அதனால் எனது சட்ட உரிமைகளும், மருத்துவ சிகிச்சையும் பாதிக்கப்படாது என்றும் புரிந்து கொள்கிறேன்.

(iii) இந்த ஆய்வில் சம்பந்தப்பட்ட எல்லாரும் எனது உடல் நலம் குறித்த அறிக்கைகளை காண என் அனுமதி தேவைப்படாது எனவும், எனது அடையாளம் ரகசியமாக பாதுகாக்கப்படும் என்றும் அறிந்து கொள்கிறேன்

(iv) மேற்குறிப்பிட்ட ஆய்வில் பங்குகொள்ள நான் சம்மதிக்கிறேன்.

சோரியாசில் : நோயால் தினமும் நோயாளிகளின் நம்பிக்கைகளும் — ஓர் இந்திய கண்ணோட்டம்.

பெயர் :

மருத்துவமனை எண் :

எந்தனை

இந்த ஆய்வு நோயாளிகள் சோரியாசில் வியாதிக்காக நாட்டு வைத்தியத்தை நாடுகின்றனர் என்றும் அதற்கும் நோயின் தீவிரத்தன்மையோடு ஏதேனும் சம்பந்தம் உள்ளதா என்றும் ஆராயச் செய்யப்படுகின்றது.

இந்தத் தேதி வரை நீங்கள் எடுத்துக்கொண்ட எல்லா சிகிச்சைகளைப் பற்றியும் அறிய நீங்கள் கேள்விகள் கேட்கப்படுவீர்கள். மேலும் ஒரு மருத்துவர் நோயின் தீவிரத்தை கணக்கிட PASI என்னும் ஒரு எண்ணிக்கையை கணக்கிடுவார்.

மேலும் இந்த நோயினால் உங்கள் அன்றாட வாழ்க்கை எந்த அளவுக்கு பாதிக்கப்படுகின்றது என்பதை அறிய சில கேள்விகள் கேட்கப்படும்.

நோயாளியின் தேவைகளை புரிந்துகொள்ளவும் அதற்கேற்ப உங்கள் சிகிச்சை முறையை மாற்றியமைக்கவும் இது மேலும் பயன்படும். இந்த ஆய்வுக்கு ஆகும் 15mins ஆகலாகும்.

எந்த விதமான கூருதல் தொல்லை கஷ்டமோ ஏற்படாது. உங்கள் பங்களிப்பு முற்றிலும் தன்னார்வமானது. இதிலிருந்து எந்நேரத்திலும் விலகலாம்.

நோயாளி விவரப் பட்டியல்

சோரியாசிஸ்: நோயின் தீவிரமும் நோயாளிகளின் நம்பிக்கைகளும் – ஒர் இந்திய கண்ணோட்டம்.

பெயர்: மருத்துவமனை எண்:

இந்த ஆய்வு எத்தனை நோயாளிகள் சோரியாசிஸ் வியாதிக்காக நாட்டு வைத்தியத்தை நாடுகின்றனர் என்று அறியவும், அதற்கும் நோயின் தீவிரத்தன்மைக்கும் சம்பந்தம் உள்ளதா என்று அறியவும் மேற்கொள்ளப்படுகிறது. இந்த தேதி வரை நீங்கள் எடுத்துக்கொண்ட எல்லா சிகிச்சைகளைப் பற்றியும், அதனால் ஏற்பட்ட விளைவுகளைப் பற்றியும் கேள்விகள் கேட்கப்படுவீர்கள்.

மேலும் நோயின் தீவிரத்தை அறிய ஒரு மருத்துவர் PASI எனும் எண்ணை கணக்கிடுவார்.

உங்கள் அன்றாட வாழ்க்கை இந்த நோயினால் எந்த அளவுக்கு பாதிக்கப் படுகிறது என்றறியவும் கேள்விகள் கேட்கப்படும்.

இந்த ஆய்வின் மூலம் நோயாளியின் தேவையைப் புரிந்து அதற்கேற்ப சிகிச்சை அளிக்க முடியும். இதற்கு சுமார் 15 நிமிடங்கள் செலவாகும். உங்களுக்கு எந்த கஷ்டமோ கூடுதல் செலவோ ஏற்படாது.

உங்கள் பங்கேற்பு தன்னிச்சையானது. எப்போது வேண்டுமானாலும் நீங்கள் விலகிக்கொள்ளலாம்.

இந்த ஆய்விற்காக வெளியிலிருந்து பணம் பெறவில்லை. எங்கள் நிறுவனமே முழு பொறுப்பேற்கிறது.

சேகரிக்கப்படும் எல்லாத் தகவல்களும்
இரகசியமாக வைக்கப்படும்.

மேலும் விபரங்களுக்கு:

டா. சு. சிறிஸ்கனா ரேச்சல்

0778946 81082

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விவரிக்கப்பட்ட ஒப்புதல்

கோரியாசில் நோயின் தீவிரமும் நோயாளிகளின் நம்பிக்கைகளும் – ஒர் இந்திய கண்ணோட்டம்

ஆய்வு எண்:

பெயர்:

வயது / பிறந்த தேதி:

நோயாளி பூர்த்தி செய்ய வேண்டியவை:

(1) _____ தேதியன்று அளிக்கப்பட்ட மேற்கண்ட ஆய்விற்கான விவரப்பபட்டியல் தாளை நான் படித்து புரிந்துகொண்டேன் என்றும் கேள்விகள் கேட்டு விளக்கம் பிற வாய்ப்பு இருந்தது என்றும் உறுதியளிக்கிறேன்.

(2) இந்த ஆய்வில் என்னுடைய பங்கேற்பு தன்னார்வமானது என்பதையும் எந்த நேரத்திலும் நான் விலகிக் கொள்ளலாம் என்றும், அதனால் என் சட்ட உரிமைகளோ, சிகிச்சையோ பாதிக்காது என்று புரிந்து கொள்கிறேன்.

(3) இந்த ஆய்வில் சம்பந்தப்பட்ட அனைவரும் என் உடல் நலம் குறித்த அறிக்கைகளைக் காண என் அனுமதி தேவையில்லை என்றும் என் அடையாளம் இரகசியமாக பாதுகாக்கப்படும் என்றும் அறிந்து கொள்கிறேன்.

(4) இந்த ஆய்வுக்குத் தொடர்பான எந்தத் தகவலையும் விஞ்ஞான ரீதியான காரியங்களுக்கு உபயோகிக்க எந்தத் தடையும் இல்லை.

(5) மேற்குறிப்பிட்ட ஆய்வில் பங்கேற்க நான் முழு சம்மதம் அளிக்கிறேன்.

கையொப்பம் :

தேதி :

பெயர் :

ஆய்வாளரின் கையொப்பம் :

தேதி :

பெயர் :

சாட்சியின் கையொப்பம் :

தேதி :

பெயர் :

. శాంపియింగ్ వివరణ పత్రము:

చదువు పేరు: సారియుంసిసి - ఇంగ్లీష్ మీడియంలో ఈ వ్యాధిని యింగ్ తీవ్రత, భావన మరియు నవ్యుక్తమ.

పేరు: - - - - - - - - - - - - -

ఆసుపత్రి నం: - - - - - - - - -

సారియుంసిసి (చివరి వ్యాధి) వ్యాధిగల రోగులు ఎంతమంది తిమ్ము తీసుకునే ముందులవల్ల ఈ వ్యాధికి వేయి పొందినా లేదా అని తెలుసు కొనుటకై ఈ చదువు.

మీరు తీసుకునే మందుల వివరము మరియు మీరు పొందిన ఇంగ్ గురించి కొన్ని ప్రశ్నలు అడుగబడును మరియు ఇక డాక్టరు, మీ వ్యాధియొక్క తీవ్రతను కనుగొనుటకై 'పంసి' రేవే ఇక పరీక్షను మీకు చేసేవరు.

మరియు మీ రాసిన జీవితాన్ని ఈ వ్యాధి ఎంత భంగించెనని తెలుసు కొనుటకు, కొన్ని ప్రశ్నలకు మీరు జవాబు ఇవ్వాలి.

డాక్టర్లు ఈ వ్యాధికి తగిన ఇక క్రొత్త చికిత్సను ప్రారంభించుటకు ఈ చదువు సహాయపడును.

ఈ పరీక్షకైన మీకే సమయము 15 నిమిషాలు మాత్రమే మరియు అడిగే ప్రశ్నలు రెండు సులభమైనవి, వీనికి మీరు ఎటువంటి రెప్పపాటు లేక సిలపై రెండు.

మీరు భంగించటం, ఈ ప్రశ్నపత్రము ఎటువంటి పరిస్థితిలోను మీరు ఈ చదువునుండి తీసుకు తీయువచ్చు. మా సి.ఎమ్.సి ఆసుపత్రిలో ఫ్రీగా లేదా రాయితీ ఖాతా వీనికి నిధి సహాయము చేయును, పై వివరాలనుండి ఎటువంటి సహాయము ఈ చదువుయొక్క రెండు సంగ్రహాంశాలు రహస్యంగా భద్రపరుచును ఏ వివరములు మూడవ మనిషికి తెలుపబడవు.

ఏవైనా సందేహములు లేక ప్రశ్నలు వీన్నుగా:

సంప్రదించవలసిన: డా. క్రిష్ణన్ రేబల్.

ఫోన్ నం.: 09894681082 / 0416-2282054.

PAGE NO.
DATE: / /

जानकारी पत्र

सोरियासिस - इस बीमारी के प्रति भारतीय मरीजों की धारणाओं एंव बीमारी का भारतीय मरीजों के प्रति व्यवहार का अध्यन।

नाम -
अस्पताल नं० -

यह अभ्यास यह ज्ञात करने के लिये किया जा रहा है कि कितने भारतीय इस बीमारी के लिये गैर-चिकित्सक मार्ग का प्रयोग करते हैं, एंव इसका बीमारी पर कितना प्रभाव पड़ता है।

आपसे आपकी बीमारी के बारे में, इसके इलाज के बारे में एंव इसकी तरक्की के बारे में विस्तार से पूछा जायेगा; उसके बाद एक ~~मापन~~ मापन पद्धति के द्वारा इस बीमारी के व्यापकता की गणना की जायेगी। यह पद्धति पी० ए० एस० आई कहलाती है।

आपके प्रतिदिन के जीवन ~~को यह बीमारी~~ पर इस बीमारी के प्रभाव का अध्यन भी किया जायेगा।

इस अध्यन के माध्यम से चिकित्सकों इस बीमारी के अच्छे इलाज में सहायता मिलेगी। यह अभ्यास केवल १५ मिनट का है, इसमें आपको किसी भी प्रकार की क्षति नहीं होगी।

आपका इस अभ्यास में योगदान, पूर्णतया

आपकी स्वेच्छा पर है; आप इस अभ्यास से किसी भी समय बाहर हो सकते हैं, यह आपके इलाज को किसी प्रकार से प्रभावित नहीं करेगा। यह अध्ययन हमारे अस्पताल की जाँच टीम के द्वारा हो रही है। किसी भी बाहरी कम्पनी इसमें कोई भागीदारी नहीं है। इसके द्वारा बात आपकी जानकारी गोपनीय रहेगी।

किसी भी संदेह को दूर करने हेतु
संपर्क करें -
डॉ० क्रिस्टीना रैचल
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0416 - 2282054

রোগীর অভ্যাতব্য বিষয় সূচী।

অধ্যয়নের বিষয় বস্তুর নাম: ভারতবর্ষের প্রেক্ষাপটে 'মোবিয়াডিক্স' ব্যাধির তীব্রতা এবং রোগীদের দৃষ্টিভঙ্গি ও বিশ্বাস।

রোগীর নাম:

চিকিৎসাশাস্ত্রের সংক্ষিপ্ত সংজ্ঞা:

এটা পর্যালোচনা করার উদ্দেশ্য যে কত রোগী মোবিয়াডিক্স ব্যাধির জন্য সবিস্তারে তথ্য ইত্যাদি ব্যবহার করে এবং মোবিয়াডিক্স এর তীব্রতার সাথে এর কোন সম্পর্ক আছে কিনা।

আজ পর্যন্ত আপনি কত বিভিন্ন প্রকার চিকিৎসা করিয়েছেন এবং তাতে আপনি কোন উন্নতি লক্ষ্য করেছেন কিনা তা আমার জন্য আপনাকে প্রশ্ন করা হবে, তাহারা একজন চিকিৎসক 'সাসি' নামক এক 'মূল্যায়নের' সাহায্যে আপনার রোগের তীব্রতা যাচাই করবে।

এই রোগ আপনার দৈনন্দিন জীবনে কতটা প্রভাব ফেলেছে তার সাথে প্রশ্নের কিছু প্রশ্নের উত্তর আপনার কেবার প্রয়োজন হবে।

এই পর্যালোচনা ডাক্তারদের এটা বুঝতে সাহায্য করবে যে রোগীর প্রয়োজন অনুসারে চিকিৎসা পদ্ধতি কতটা পরিবর্তন করা প্রয়োজন।

এই খুবো অনুসন্ধান মোটামুটি ১৫ মিনিটের মধ্যে শেষ হবে, সব প্রশ্নগুলো সহজ।

আপনাকে কোন রকম অস্বস্তির সম্মুখিন হতে হবে না অথবা কোন অতিরিক্ত খরচ বহন করতে হবে না।

আপনার যোগদান সম্পূর্ণরূপে স্বেচ্ছামূলক এবং যে কোন সময়ে এই কার্যক্রম থেকে আপনি হাঁচ্ছে মত বিরত হতে পারেন। এতে করে আপনার চিকিৎসায় কোন প্রকার বিঘ্ন ঘটবে না, এই অধ্যয়ন কার্যক্রমের ব্যয় ভার আমাদের নিজস্ব সংস্থা গবেষণা পরিচালনা সমিতির দ্বারা বহন করা হয় এবং এই ব্যাপারে কাহারোও কোন আর্থিক সাহায্য আমরা গ্রহণ করি না। এই অধ্যয়নের মাধ্যমে সংগৃহীত তথ্য গুপ্ত রাখা হবে। ব্যক্তিগত তথ্যাবলি—

প্রকাশিত হবে না।

যদি কোন জিজ্ঞাসা থাকে :

অধ্যাপক ফারুক — ড: এস. সিদ্দিকী রাজেন

মোবাইল নং: ০১৮৭৪৬৮৫০৮২

ফোন : ০৪১৬ - ২২৮২০৫৪